NATUR CYMRU
Nature of Wales

Number/Rhif 54 • Spring/Gwanwyn 2015

- Dragonflies
- Birds on the Dee Estuary
- Sychder eithriadol 1887
- Teifi Marshes
- Tŷ Newydd
- Cors Fochno
- Argent & Sable moth

Books, news, comment ...

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Natur Cymru is published four times per year, in March, June, September and December. Articles are published in the language in which they are submitted. All prices include UK P&P.

• Individual £18.00 • Direct Debit £17.00 – please enquire • Corporate £32.00 • Back issues £3.50
Special offer to subscribers only – 5 or more back issues for only £1.00 each

BINDERS hold 10 issues, complete with index: 1: £8.95 • 2: £16.95 • 3: £24.95 • 4: £31.95
Cheques payable to Natur Cymru Ltd. Card payments 01248 387373 or www.naturcymru.org.uk

Cwmni Cyfyngedig trwy Warant yw Natur Cymru Cyfyngedig, ac nid yw'n gwmni sy'n gwneud elw. Mae wedi ei gofrestru yng Nghymru a Lloegr, rhif 5636217. Nid barn Natur Cymru Cyfyngedig neu'r Golygyddion a leisir yn y cylchgrawn hwn o angenrheidrwydd.

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Llun y clawr/Front cover:
Dragonfly by Mandy Marsh

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Argraffwyd yn y DU gan Cambrian Printers Ltd. Achrediad ISO-14001 a Systemau Rheoli Amgylcheddol blaenllaw. Argraffwyd ar bapur ffynonellau cymysg yr FSC Mwydion o goedwig a ardystir gan yr FSC. Ffynonellau a reolir, heb gynnwys coedwigoedd annerbyniol. Rhif cadwyn gwarchodaeth TT-COC-2200. www.fsc-uk.org

Printed in the UK by Cambrian Printers Ltd. ISO-14001 accredited with award winning Environmental Management Systems. Printed on FSC mixed sources paper. Pulp from an FSC-certified forest. Controlled sources, which exclude unacceptable forestry. Chain of custody number
TT-COC-2200. www.fsc-uk.org

ISSN 1742-3740

Lluniau eraill/Other illustrations: Mandy Marsh

Dylunio gan/Design by: Mel Parry Design, dmelparry@gmail.com

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GOLYGYDDOL EDITORIAL

Mae'r themâu sy'n rhedeg drwy'r rhifyn hwn yn dangos gwerth gweithredu uniongyrchol a sut y gall gwirfoddolwyr wneud gwahaniaeth gwirioneddol i gofnodi a chadwraeth natur. Mae hanes sefydlu Gwarchodfa Natur Genedlaethol Cors Fochno yn yr 1950au a'r 1960au yn dangos y dyfalbarhad oedd ei angen i sicrhau nad oedd yr orgors arfordirol hon yn cael ei draenio ar gyfer defnydd amaethyddol dwys. Stori arall am natur a'r arfordir a geir yng Nghorsydd Teifi. Lle mae'r afon a'r môr yn cwrdd crëwyd gwlyptiroedd sy'n gyfoethog mewn bywyd gwyllt ac mae'n cael ei fwynhau gan ymwelwyr lawer.

Mae'r bartneriaeth 40 mlynedd rhwng gwirfoddolwyr lleol a diwydiant a sicrhaodd boblogaeth fridio fwyaf Cymru o fôr-wenoliaid cyffredin yng ngwaith dur Shotton yn dangos yr hyn y gellir ei gyflawni drwy ymroddiad, ac mae'n brawf hefyd o sut mae byd natur yn ein synnu'n gyson. Ar aber ehangach y Dyfrdwy, mae cofnodi gan wirfoddolwyr dros y 30 mlynedd diwethaf wedi dangos newidiadau sylweddol i'r poblogaethau adar dŵr sy'n rhyngwladol bwysig. Pwy fyddai wedi rhagweld yn yr 1980au y byddai gennym bellach grehyrod bach capog yn magu a heidiau o wyddau troetbinc yn symud ar draws awyr y gaeaf?

Mae cyhoeddi *Atlas of Dragonflies in Britain and Ireland* a darganfod brychanau pennau saethau yn ddiweddar yng ngogledd-orllewin Cymru yn enghreifftiau pellach o bwysigrwydd gwirfoddolwyr a'u cyfraniad i gofnodi bywyd gwyllt. Dengys yr hanesion ysgrifenedig o sychder 1887 yng Nghymru sut y gall tystiolaeth o'r gorffennol gyfrannu at ein dealltwriaeth heddiw o amgylchedd Cymru.

Sefydlwyd *Natur Cymru* i roi cartref i erthyglau sy'n cofnodi byd natur yng Nghymru, gan sylweddoli pwysigrwydd y cofnod ysgrifenedig i wella'n gwybodaeth a'n dealltwriaeth. Gyda'r pwysau cynyddol ar natur Cymru a'i bwysigrwydd cynyddol i bobl Cymru, ni fu erioed adeg bwysicach i *Natur Cymru* barhau â'r dasg hon.

The themes that run through this issue demonstrate the value of direct action and how volunteers can make a real difference to the recording and conservation of nature. The story of the establishment of Cors Fochno National Nature Reserve in the 1950s and 1960s reveals the perseverance that was required to ensure that this unique coastal raised bog was not drained for intensive agricultural use. Nature and coast play out a different story at the Teifi Marshes, where the meeting of river and sea has created wildlife-rich wetlands now enjoyed by many visitors.

The 40-year partnership between local volunteers and industry which secured Wales' largest breeding population of common terns at Shotton steelworks shows what can be achieved through dedicated effort, and also the constant surprises that nature can spring on us. On the wider Dee Estuary, volunteer recording over the last 30 years has revealed significant changes to the internationally important water-bird populations. Who would have predicted in the 1980s that we would now have breeding little egrets and skeins of pink-footed geese moving across our winter skies?

The publication of the *Atlas of Dragonflies in Britain and Ireland* and the recent discovery of the Argent and Sable moth in north-west Wales are further examples of the importance of volunteers and their input to wildlife recording. The written accounts of the 1887 drought in Wales show how evidence from the past can contribute to our present understanding about the Welsh environment.

Natur Cymru was established to provide articles of record about the nature of Wales, recognising the importance of the written record to improve our knowledge and understanding. With the continuing pressures on Welsh nature and its growing importance to the people of Wales, there has never been a more important time for *Natur Cymru* to continue this task.

David Parker

Dragonflies in Wales - from the records

Mark Tyrrell

Migrant hawker *Aeshna mixta* was a rare migrant to Britain in the 1940s: it can now be found across most of Wales.

With more people than ever keen to record and contribute their observations of nature, the latest dragonfly atlas has been able to provide a much fuller picture of dragonfly distribution in Wales than was previously known, based on their records. BRIAN WALKER and CLAIRE INSTALL look at the spread of new species into Wales and the reasons why this may be happening.

The British Dragonfly Society (BDS) has recently published the *Atlas of Dragonflies in Britain and Ireland*, an up-to-date overview of the distribution of dragonflies compiled from the contributions of a great many volunteer recorders (see *Natur Cymru* 52 p50). This is the second published Atlas of dragonfly distribution: the first was compiled using all records up to 1990, and the new atlas provides an interesting insight into changes that are occurring.

Atlas coverage

The Atlas is based on 10km squares (hectads) and the recording coverage achieved during this project (2007-2011) was very high, with the majority of hectads visited by recorders in the course of the Atlas period. This high level of coverage inevitably revealed some sites for dragonflies that had not previously been recorded, and this needs to be remembered when assessing the distribution changes revealed by the Atlas. However, there are clearly some significant changes since the first

Dragonfly Atlas was produced. The Atlas considers changes in the context of the whole of Britain and Ireland but it also reveals changes at a regional level, and analysis of the underlying data provides even more detail.

Recent colonists and range expansions into Wales

Some of the most dramatic changes concern species colonising Britain from the continent. The first of these to gain a foothold was the Small red-eyed damselfly *Erythromma viridulum*, which was first recorded in Essex in 1999. It has subsequently spread rapidly and can now be found quite widely south-east of a line between the Humber and the Severn, with a few recent records from the south-east corner of Wales. This range expansion seems to have slowed recently, but now that it has reached Wales it will be interesting to see if it continues to edge further north-westwards and gain an even firmer presence. Other more recent colonists, such as Willow emerald damselfly *Chalcolestes viridis* and Southern migrant hawker *Aeshna affinis*, are currently restricted to south-east England, and only time will tell how far they will spread now that they have arrived in Britain.

Migrant hawker *Aeshna mixta* was a much earlier colonist and rare migrant to Britain in the 1940s. By 1990 it too could be found south-east of a line between the Humber and Severn and along the south Wales coast. Since then it has pushed north-westwards and the new Atlas shows it now occurs widely in eastern Wales and, since 2003, in the north of the country as far west as Anglesey. Black-tailed skimmer *Orthetrum cancellatum*, while a long term resident in south-east England, had a similar distribution to Migrant hawker in 1990. It has subsequently shown a similar expansion into Wales, but with fewer records in the centre of the country. Other species that had a southerly distribution in 1990 have also expanded north. Emperor dragonfly *Anax imperator* was firmly established in south Wales but now occurs widely across the whole country, and Broad-bodied chaser *Libellula depressa* has in-filled the northen part of central Wales, an area where it was previously largely absent.

It is interesting that the spread of these species has

Mark Tyrrell

The Black-tailed skimmer has recently spread into Wales.

largely been into areas of Wales with the highest levels of solar radiation. These are the coastal regions in the north and south, with the highest levels at the western ends and particularly in Pembrokeshire. Levels of solar radiation influence the amount of heat absorbed by water bodies, meaning ponds and lakes are likely to warm more quickly in these areas. It is unlikely that this is the sole driver for expansion, but it is an interesting correlation.

Species with important Welsh populations

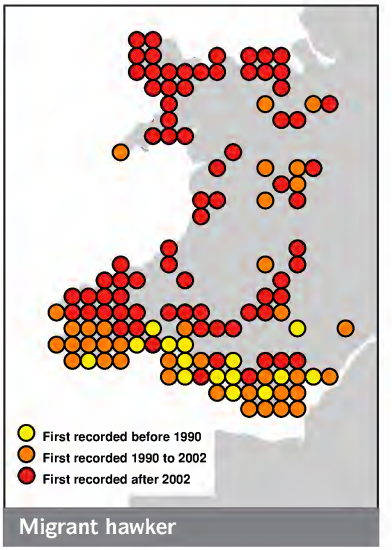
There are a number of species in Britain with special habitat requirements that are under threat. The decline in quality of some existing sites and the fragmented nature of specialist habitats, combined with poor dispersal capability of the species, means that natural spread and colonisation is difficult if not impossible. In the current Atlas period, one third of the hectads in which Southern damselfly *Coenagrion mercuriale* was found are in Wales, although some of the populations are quite small. Unfortunately this is a reduction in the number of hectads previously occupied in Wales. In southern England gains for this species have outweighed losses over the same period, and a number of English sites still contain quite strong populations. Southern damselfly is listed as Near Threatened in the European Red List, Endangered on the Great Britain Red List, and is a UK BAP Priority Species. BDS has developed projects to restore and improve habitat at the key Welsh sites in Pembrokeshire, and has a programme

David Kitching

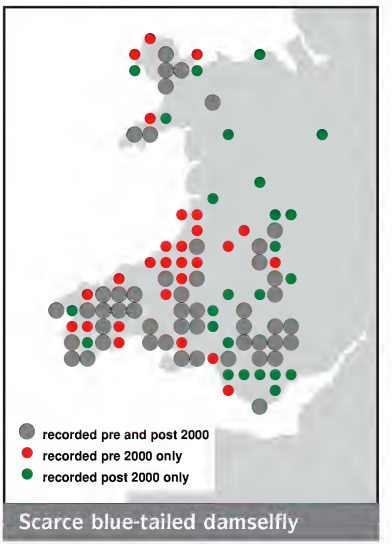
Golden-ringed dragonfly *Cordulegaster boltonii*. Mature individuals have striking green eyes

to check on the success of this work and monitor the health of populations more widely.

A glance at the maps in the Atlas reveals that Wales is also an important area for Scarce blue-tailed damselfly *Ischnura pumilio*, which is classified as Near Threatened on the Red List; around half of all occupied hectads in the UK are in Wales. It is a species that colonises newly created shallow water areas, but colonies can be short lived and disappear as vegetation grows and the habitat matures and becomes unsuitable. The species can persist for many years at sites such as seepages used by livestock, which maintain the appropriate habitat conditions. Sites in Wales are a mixture of these permanent sites and more transient locations. It is a species where gains and losses of sites are equally high, but it seems to be sufficiently dispersive to find and colonise new habitat.



Migrant hawker



Scarce blue-tailed damselfly

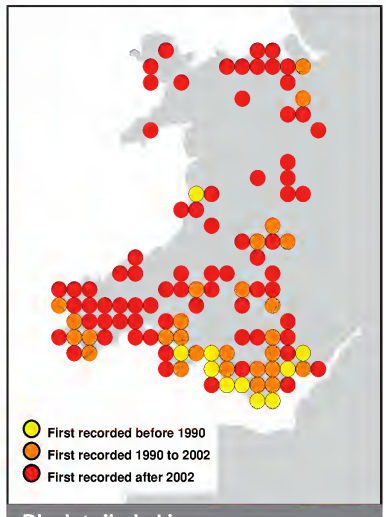
Puzzling changes – cause for concern?

There is strong evidence that warmer summer temperatures, and perhaps more especially higher solar radiation levels, are driving the range expansions of species previously restricted to south-eastern England. Brown hawker *Aeshna grandis* appears to be associated with this trend, with an expansion to the north and west, but to a noticeably lesser extent than other non-specialist species. The range in Wales has expanded by only 10-20km since 2000. The general view of recorders in southern Britain is that this species is increasing, but trend analysis by the Centre for Ecology and Hydrology, using the underlying Atlas data, suggests a decrease in the number of recording visits in which it is noted. The number of records on hectads in east Wales has increased considerably, however the chance of seeing the species has increased only slightly. This suggests that it is not firmly established in Wales and that the apparent range expansion is more related to casual visitors than increased breeding populations. It would seem that there may be other factors influencing what happens with this species. As eastern Wales is the edge of its current range, future changes here may help to clarify what is happening.

Golden-ringed dragonfly *Cordulegaster boltonii* is a striking species and relatively common across most of Wales, but the Atlas does indicate some Welsh losses. Given the higher level of recording effort during the Atlas project, this apparent reduction is a concern. The data also show the species being recorded on fewer recording visits. The decline, if it is real, seems to be more marked in the east of the country, namely around Montgomeryshire. It is tempting to consider whether this is related to the temperature changes which are moving other species, like Migrant hawker and Black-tailed

Claire Install

A recently dug pond on Dowrog Common, Pembrokeshire



Black-tailed skimmer

skimmer, into this area. Interestingly, Brown hawker shows the greatest westerly range expansion here. However, Golden-ringed dragonfly is doing well in southern England where summer temperatures are higher, so there must be other factors at play if this range contraction is real. The apparent changes may not be significant at present but it is a situation that needs to be monitored to establish whether there are real reductions and, if there are, why they are occurring.

The Atlas project was supported by a number of bodies including the Countryside Council for Wales (now Natural Resources Wales) and has generated a greater interest in the dragonfly population. While the picture that emerges is generally positive, there are a few concerns and some issues which need to be monitored or are worthy of further study. BDS wants to maintain the momentum generated by the Atlas project to continue to track dragonfly populations. If you see a dragonfly, please submit the record either online (www.british-dragonflies.org.uk) or send the record to your local Vice-County Recorder (details on the website).

***Brian Walker** is a Trustee of the British Dragonfly Society and an active dragonfly recorder. **Claire Install** is Conservation Officer for the British Dragonfly Society and has managed habitat restoration work for Southern damselfly in Wales.*

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Gweision y Neidr yng Nghymru

Mae atlas newydd ei gyhoeddi o ddosbarthiad gweision y neidr ym Mhrydain ac Iwerddon wedi datgelu tuedd i rai rhywogaethau ehangu eu tiriogaeth yn Lloegr tua'r gogledd, a thua'r gorllewin i Gymru. Efallai bod hyn yn gysylltiedig â hafau cynhesach: mae'r ardaloedd newydd eu gwladychu yn neilltuol yn rhai gyda rhagor o belydriad heulog, lle bydd dyfroedd yn amsugno gwres yn gynt, ac yn darparu cynefin addas. Nid yw pob gwas y neidr, serch hynny, yn dilyn yr un patrwm. Mae'r rhai ag anghenion arbennig â llai o gyfle i ymledu, oherwydd cynefinoedd gwael neu ynysig, er nad yw'r Gwas neidr brown, anarbenigol wedi ymledu cymaint ag y gellid ei ddisgwyl. Mae'r Gwas neidr eurdorchog, sy'n rhesymol o gyffredin yng Nghymru, wedi crebachu rhywfaint; ond mae poblogaeth y Fursen dinlas fach, er wedi newid ei dosbarthiad, yr un mor niferus, ar y cyfan.

Lynne Greenstreet

Recording the waterbird splendour of the Dee Estuary

The Dee Estuary is one of the most important estuaries in the UK for its extensive intertidal habitats and its spectacular numbers of waterbirds – wildfowl, waders, herons, cormorants and terns – which are found all year, but especially in the winter. Here ***NEIL FRISWELL*** *and* ***COLIN WELLS*** *describe the estuary and the counting of its birds over the last 30 years though the internationally renowned Wetland Bird Survey.*

Waders in flight

The Dee Estuary in north-east Wales is the seventh most important site in the UK for wintering waterbirds, with mean peak counts over the last five years of 123,921 birds[1]. It covers an area of 14,762 ha and comprises extensive saltmarsh in the inland part and sand/mudflats at the seaward side. The national boundary with England runs down its centre. Over the last three centuries people have modified the estuary, starting with attempts to maintain a navigable route into Chester by re-aligning the river channel on the Welsh side in the 1730s. Significant estuary reclamation between Connah's Quay and Chester was followed by closing off the old channel with a railway in the 19th century. This resulted in extensive development of saltmarsh, initially from Burton, then to Neston and now to Heswall, with the main river channel remaining close to the Welsh shore.

There is only patchy historic information about the numbers of birds using the estuary before the mid 20th century, though we know that

there was a thriving trade in wildfowl and waders from punt-gunning in the 19th century. This had declined significantly by the early 20th century: Dockray[2] wrote *"gone are the thousands of Barnacles ...., the countless thousands of wigeon and other ducks, the hosts of waders: compared with these armies a mere handful remains today"*. The declines were attributed to land reclamation but commercial over-exploitation must have played a part. In more recent years the development of industry, particularly on the Welsh side, has also been significant, leading to further loss of estuary habitat. Despite these losses, the estuary is still of major importance in the North Atlantic and West European flyways both for wintering and passage birds. Birds which breed in the Arctic, from Eastern Canada across to Russia, come to winter in the relatively mild climate found here. They are only 'our' birds for the brief winter period!

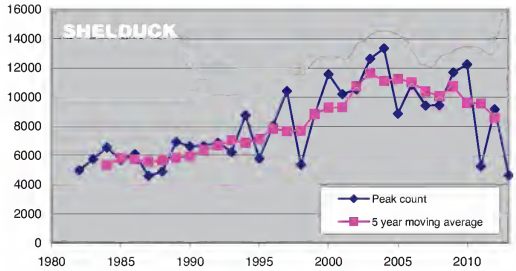
The first systematic counts to quantify the numbers of waterbirds using estuaries throughout the UK started with the National Wildfowl Count (concentrating on geese and ducks) after the 2nd World War. This was extended to all waterbirds with the Birds of Estuaries Enquiry (BoEE) in 1969 and these two surveys amalgamated into the Wetland Bird Survey (WeBS) in 1993, which has continued uninterrupted since then. For survey purposes the Dee Estuary is divided into 42 count sectors, and 20 volunteers carry out the counts on a fixed day each month throughout the year. These counts are at high tide and the totals give a good estimate of the total population of waterbirds in the estuary. A parallel set of counts is carried out at low tide every five years, and these define the key feeding areas within the estuary. The counts take place from Gronant, through the estuary itself and to the North Wirral foreshore, and include some coastal fields.

International and National Importance
A wetland is considered 'Internationally Important' if it regularly holds at least 1% of the individuals in a population of one species or subspecies of waterbird. A wetland in Britain is considered 'Nationally Important' if it regularly holds 1% or more of the estimated British population of one species or subspecies of waterbird.

The WeBS and predecessor schemes have been crucial in the Dee Estuary, gaining and retaining both national and international recognition for its birds and their habitats. Today it has national (SSSI), European (SPA, SAC) and International (Ramsar) designations.

Wildfowl

The key duck species using the estuary are all dabbling duck – shelduck *Tadorna tadorna*, pintail *Anas acuta*, wigeon *Anas penelope*, teal *Anas crecca*, and mallard *Anas platyrhynchos* – which mainly feed in the saltmarsh, though shelduck and sometimes pintail also use the extensive mudflats. Shelduck and pintail are present in Internationally Important numbers (see Box) and the Dee Estuary is the most important site in the UK for these species. Both also show a similar pattern in population change; a rise in numbers since the early 1980s followed by declining numbers in recent years, especially with pintail. The reasons for this are unclear but, as very similar trends are seen in total UK numbers, it is probable that the explanation lies outside of the estuary. Shelduck increased steadily up to about 2003 and this was attributed to a rise in numbers carrying out their annual moult locally on the Mersey and Dee Estuaries rather than flying to Heligoland in Germany.

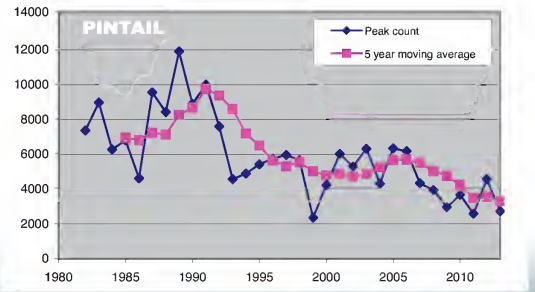


The wintering pintail population is increasing in the Netherlands which may be a consequence of warmer winters, with fewer flying on to the UK.

Numbers of teal and wigeon have remained fairly stable at about 4,000 birds, with teal present in Nationally Important numbers. However, numbers of mallard have declined dramatically since the 1980s, from peaks of about 5,000 to only 1,000 in recent years. Part of this decline may be caused by a reduction in numbers bred and released for shooting, but it does mirror trends throughout the UK. In the past there were small numbers of diving duck, principally scaup *Aythya marila*, wintering in the estuary but these have essentially disappeared today.

The days of huge goose flocks are long gone but, for the last eight years, pink-footed geese *Anser brachyrhynchus* have started to winter here and have increased to over 6,000 in the last two years. Increasing sanctuary areas are probably responsible. In the outer estuary around Hilbre Island, pale-bellied brent geese *Branta bernicla* ssp. *hrota* have started to overwinter, with a recent peak of 260. These birds are from the East Canadian High Arctic population, further illustrating the international origins of the estuary's birds.

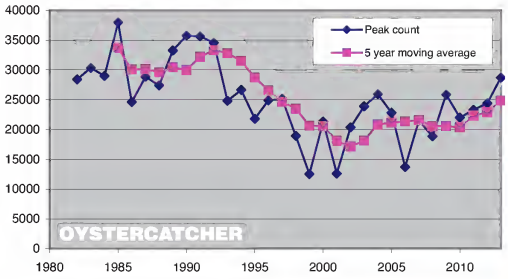
Significant numbers of swans use the estuary and adjoining fields in winter. Mute swan *Cygnus olor* is the most common, with 100-120 in most winters. Both Bewick's *Cygnus columbianus* and whooper



David Parker

Prolonged frozen conditions can reduce available feeding on the estuary's mudflats.

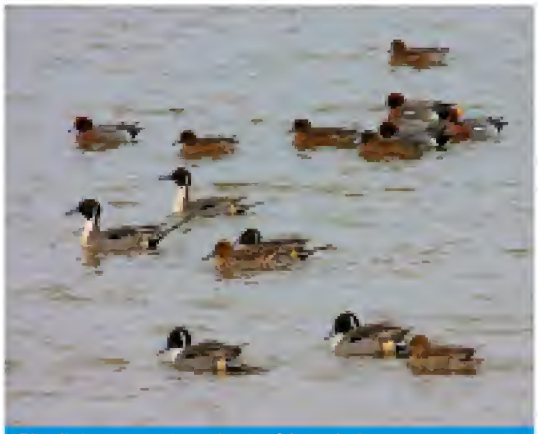
swans *Cygnus cygnus* are relatively recent arrivals, with the former peaking at 118 in winter 2000/01 and the latter at 86 in winter 2010/11. Numbers of Bewick's have fallen recently in line with a UK trend of a switch from west to east coast sites in the UK, perhaps due to milder winters. However, numbers of whooper swans, which breed in Iceland, are still increasing.



Waders

Five wader species – redshank *Tringa totanus*, black-tailed godwit *Limosa limosa*, oystercatcher *Haematopus ostralegus*, knot *Calidris canutus* and dunlin *Calidris alpina* – winter in Internationally Important numbers and are ranked respectively as the 2nd, 3rd, 4th, 7th and 13th most important populations in the UK. The estuary is also Internationally Important for ringed plover *Charadrius hiaticula* based on passage numbers. All are species which predominantly feed on the rich invertebrates of the mudflats but there are some very different – and interesting – trends in populations.

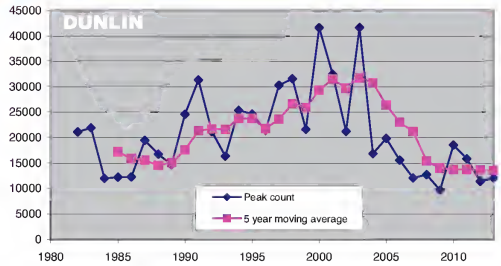
Lynne Greenstreet



Pintail *Anas acuta* hwyaden lostfain and wigeon *Anas penelope* chwiwell

RSPB Dee Estuary

Colin Wells counting birds on the Dee Estuary saltmarsh



Oystercatchers typically peaked at over 30,000 throughout the 1980s but in the early 1990s numbers started to fall quite strongly. This coincided with a large increase in commercial cockling, which was essentially inadequately managed and unregulated, and led to calls from conservationists for much greater control. Eventually a Cockle Regulating Order came into force and numbers have since slowly increased, though at 25,000 are still below former levels. Black-tailed godwits are a relatively new arrival but have risen from a few hundred in the 1980s to about 6,000 now. These birds are the Icelandic race, ssp. *islandica* and the increase is linked with a rise in breeding populations there. Both knot and redshank numbers are essentially stable and contrast with dunlin whose numbers have risen from 15,000 to a peak of over 30,000, only to fall back to former levels. This is similar to the UK trend and is attributed, as for a number of wader species, to 'short-stopping' whereby Arctic breeding species are

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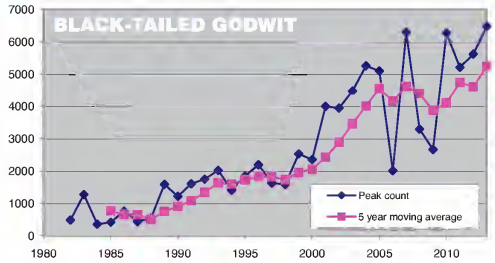
Little egret *Egretta garzetta* Crëyr bach



wintering more in continental European countries as a result of warming winters.

Grey plover *Pluvialis squatarola*, sanderling *Calidris alba*, bar-tailed godwit *Limosa lapponica* and curlew *Numenius arquata* occur in Nationally Important numbers in the estuary. Grey and ringed plovers show an increase up to about 1995 then a subsequent decline to a new fairly stable level: the others are fairly stable, again all reflecting the UK trend. It is encouraging that there are no changes in wader numbers, apart from oystercatcher, which can be attributable to local environmental changes. This suggests that the habitat remains in favourable condition to support these birds.

Herons, cormorants and terns

Another change over the last 30 years is the growth in the numbers of little egrets *Egretta garzetta*, which are now a very common sight. They have started to breed in adjoining woodland (40 nests in 2014) and up to 400 have been recorded at roost sites. Tantalisingly, there have been increasing records of spoonbill *Platelea leucorodia*, great white egret *Ardea alba* and even cattle egret *Bubulcus ibis* in recent years – might they breed soon??

Cormorants *Phalacrocorax carbo* occur in Internationally Important numbers, the population having risen dramatically with up to 1,800 now wintering, making the estuary the most important UK site for this species. A major roost site has recently been identified in the saltmarsh, with numbers more or less coinciding with the peak WeBS counts.

Three species of tern are also of major importance. The only Welsh colony of little terns *Sternula albifrons* breeds at Gronant and birds feed in the outer estuary. Up to 135 pairs breed and, through protection and monitoring, we know that productivity is consistently high. Common terns *Sterna hirundo* have bred at Shotton steel works since the 1970s and, again, the colony is among the top UK sites (see page 19). Sandwich terns *Sterna sandvicensis*

occur as passage birds with peak counts up to 2,300 in late summer passage, which is the second highest level in the UK.

The future

There have been dramatic changes in the past to the habitats and birds of the estuary. However, we can be cautiously optimistic about the future for at least two reasons. Firstly, much of the estuary is under active conservation management. RSPB have steadily increased the area they own or manage since first acquiring their Gayton Sands Reserve in 1979, and now manage over half of the estuary. Apart from the management provided by grazing with sheep, there are now extensive sanctuaries which are particularly valuable for the saltmarsh birds, particularly the ducks and geese. Secondly, the national and international designations based on systematic WeBS counts give much greater protection against any future potentially damaging activities. There are, of course, still possible threats. Industrial development was formerly a major issue and recent proposals for reclamation, dredging and underground coal gasification have revived concerns. Climate change, sea-level rise and increased leisure activity causing disturbance are also significant concerns, but we have confidence that with the correct care and management the habitats and wildlife of the Dee Estuary will continue to flourish and its splendour will be enjoyed by all for many years to come.

*After retiring from a career in the oil industry in 1998, **Neil Friswell** has worked as a volunteer in the environmental sector, mainly for RSPB but also as Trustee of Cheshire Wildlife Trust. He is a past Chairman of the Dee Estuary Conservation Group.*

***Colin Wells** has worked for RSPB for nearly 40 years and is Site Manager on the Dee Estuary reserve where he has been for over 30 years. He has participated in ornithological expeditions to survey wintering waterfowl populations in Saudi Arabia, Tanzania and Syria.*

Acknowledgements

The Wetland Bird Survey is mainly carried out by expert volunteers and is administered by the British Trust for Ornithology, working with the RSPB, the Joint Nature Conservation Committee and the Wildfowl and Wetlands Trust. Website: http://www.bto.org/volunteer-surveys/webs The RSPB coordinates the WeBS count on the Dee Estuary.

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2. Dockray J.A. 1910 in *The Vertebrate Fauna of Cheshire, Vol 2*. T.A. Coward ed. Witherby, London.

Lynne Greenstreet

Roosting knot (Calidris canutus Pibydd yr aber) at Hoylake

Ysblander adar dŵr Aber Dyfrdwy

Mae Aber Dyfrdwy yn bwysig yn y DU oherwydd ei chynefinoedd rhynglanwol helaeth a'r nifer aruthrol o adar dŵr sydd yno, ac yn enwedig oherwydd yr adar sy'n gaeafu yno ar eu ffordd o'r Arctig. Erbyn canol yr ugeinfed ganrif roedd nifer yr adar wedi dirywio'n sylweddol oherwydd saethu, adennill tir a diwydiant. Mae'r adar wedi'u monitro ers 60 mlynedd a mwy, yn fwyaf diweddar gan y 'Wetland Bird Survey', ac mae'r casgliadau hyn wedi bod yn hollbwysig o ran sicrhau dynodiadau cenedlaethol a rhyngwladol i'r safle. Yr aber yw'r safle pwysicaf yn y DU o safbwynt hwyaden yr eithin a'r hwyaden lostfain. Rhywogaethau nodedig eraill yw'r gorhwyaden, y fulfran, y pibydd coesgoch, y rhostog gynffonddu, y bioden fôr, pibydd yr aber a phibydd y mawn. Mae poblogaethau'r crëyr bach hefyd ar gynnydd.

Y Tywyddiadur

Sychder eithriadol 1887 yng Nghymru a thu hwnt

Alun Williams

Cynyddodd niferodd petris yn gyflym yn ystod sychder 1887
Grey partridge populations soared in the drought of 1887

Yn Rhan 1 a Rhan 2 o'r gyfres hon (Natur Cymru 50 a 51) amlinellwyd y mathau o ddata dyddiadurol Cymraeg a geir yn Y Tywyddiadur, sy'n rhan o wefan Llên Natur. Cyflwynwyd hefyd rywfaint o'r astudiaethau achos penodol a gododd o ymchwilio bron 90,000 o gofnodion Y Tywyddiadur. Y tro hwn mae ***DUNCAN BROWN*** *a* ***TWM ELIAS*** *yn trafod cofnodion o ddyddiaduron a phapurau newydd sy'n cyfrannu at y dystiolaeth a'r drafodaeth ynglŷn â'r cyfnod hir o sychder eithriadol a effeithiodd yn sylweddol ar Ewrop ar ddiwedd y 19eg Ganrif.*

Yn 1882 dechreuodd cyfres nodedig o dair mlynedd ar ddeg o flynyddoedd sych. Y flwyddyn 1887, blwyddyn jiwbili y Frenhines Fictoria, oedd y sychaf a welwyd yn ystod y 19egG. Drwy ddadansoddi tystiolaeth o ddyddiaduron a phapurau newydd y cyfnod ceir darlun o ddatblygiad sychder meteorolegol (pryd na chafwyd glawiad o bwys) enbyd y flwyddyn honno, ac ni ddaeth y sychder hydrolegol (a adlewyrchir yn sychder a lefel trwythiad y pridd) i ben am rai blynyddoedd wedyn. Pwrpas yr ymdriniaeth hon yw cyfleu darlun o'r 'sychder amaethyddol' a oedd yn effeithio ar gnydau; y 'sychder cymdeithasol-economaidd' a effeithiai ar iechyd a gwaith pobl ac, yn ychwanegol, y 'sychder ecolegol' a effeithiai ar fyd natur.

Y tywydd yn Ewrop yn 1887

Cafwyd tywydd anarferol ar gyfandir Ewrop ym mis Mehefin 1887. Dioddefodd taleithiau canolbarth Sbaen bla o locustiaid a ddinistriodd y cnydau gwair, gwenith, gwinwydd ac olewydd gan dywyllu'r wybren am

gyfnodau oherwydd eu niferoedd (*Cardigan Observer*, 11 Mehefin 1887).

Ar y 5ed o Fehefin bu storm ddychrynllyd yn ardal Figeac, gogledd Ffrainc, pan ddifrodwyd y cnydau gan beli mawr o genllysg. Pan aeth y bobl ati i ganu clychau'r eglwys er mwyn clirio'r cymylau bygythiol trawyd y clochdy gan daranfollt gan ddymchwel tŵr a tho'r eglwys gan ladd neu losgi rhai o'r gynulleidfa oedd yn gweddïo yno ar y pryd (*Aberystwyth Observer,* 11 Mehefin 1887). Dair wythnos yn ddiweddarach bu storm fawr yn nhref Toulouse, de Ffrainc, pan chwalwyd sbowt dŵr a pheri i olchfa gyhoeddus oedd yn llawn golchwragedd gael ei hysgubo ymaith gan ddŵr, gan ladd tair o'r menywod.

Effaith y tywydd ar fywyd gwyllt.

Yn ardal Glyndyfrdwy, Llangollen, yn ôl y *Cardigan Observer and General Advertiser*, cafwyd y 'tân gwaethaf erioed yng Nghymru' (20fed Mehefin 1887). Llosgodd arwynebedd o 4 x 2 milltir o dir mynydd. Ystyriwyd nad oedd cyflwr hylosg y bryniau yn ddigon o reswm am y tanau ond roedd rhaid bwrw bai ar rhywun. Un o'r bugeiliaid yn tanio cetyn gafodd y bai yng Nglyndyfrdwy ac nid, sylwer, tanau dathlu'r Jiwbili gerllaw! Mawr oedd y difrod i'r stoc o gwningod a grugieir ifanc gwerthfawr ar y mynydd. Ond er y gweiddi gwae, yn ddiweddarach ar weundiroedd yr ystadau cyfagos cafwyd cnwd da o rugieir cydnerth, yn ôl y *Cambrian News* (26 Awst) - a Syr Watkin wrth ei fodd mae'n siwr!

Ganol Awst adroddwyd bod *"outstanding bags of partridges reflect a real peak in the partridge population...quite exceptional in Denbigh and Merioneth* (Matheson: 'The Partridge in Wales', yn *British Birds* 67, 1953). Y tymor hwnnw cafwyd cnwd eithriadol o betris ar draws y Deyrnas yn gyffredinol ac roedd hi'n flynyddoedd ers i'r helfa fod mor doreithiog yn swyddi Caer, Warwick ac Efrog (*Cardigan Observer*, 10 Medi 1887). "Pleserwyr" gafodd y bai am dân ofnadwy ym Mhlwyf Penrhydd, Sir Benfro, ddechrau mis Awst, a dialedd amaethwyr gafodd y bai am un arall; "... trwy fod plwyfolion.... heb gael tipyn o ostyngiad [yn eu rhent?] ar yr amser caled yma".

Mewn pwll ym Mrymbo ym mis Gorffennaf sychodd y

Scott Bauer PD-USGOV-USDA-ARS

Cafodd y pryf haidd a allai fod yn ddinistriol ei ganfod yng Nghymru
The potentially destructive Hessian fly was spotted in Wales

pyllau a chynhesodd y dŵr nes bod cyrff brithyll marw yn arnofio. Ond bu'r cyfnod yn arbennig o dda i eosiaid gyda 5 neu 6 o adroddiadau ar hyd a lled Cymru dros 1887-88 am barau yn diddannu trigolion pentrefi yn yr hwyrnos gyda'u cân.

Enghraifft posibl y sychder oedd ymddangosiad, mewn tri lle, y mân-wybedyn a ofnwyd yn fawr, sef y pryf haidd (*Hessian fly*) *Mayetiola destructor*. Siarswyd amaethwyr i fod yn wyliadwrus o'u cnydau cyn iddi fynd yn rhy hwyr i'w atal (*Weekly Mail* 23 Gorffennaf 1887). Ar ddechrau mis Awst cafwyd pla o fosgitos yn ardaloedd Camberwell a Dulwich, Llundain a fanteisiodd, yn ôl y sôn, ar y tir corslyd a'r gwres i ffynnu. (*Aberdare Times* 6 Awst 1887).

Pan agorodd tymor yr hydref gyda glaw wedi'r sychder a'r gwres, fe gafwyd – nid yn annisgwyl - gnwd trwm o fadarch yng ngogledd Cymru, fel yr adroddwyd yn y *Cambrian News and Merionethshire Standard* (16 Medi, 1887). Allforiwyd *"truckloads of these esculents"* i Lundain a threfi eraill. Soniwyd yn *The Welshman* (16 Medi, 1887) bod posib llenwi cawelliad bychan o fewn deng munud i bentref Llanybydder. Danfonwyd llawer ar y trên pob dydd.

Gall gymryd blwyddyn gron cyn i ni weld ymateb rhai rhywogaethau (pryfed yn arbennig) i amgylchiadau eithriadol yn y tywydd. Roedd y flwyddyn ganlynol 1888 yn un o'r goreuon am y mewnfudwr crand: y gwalchwyfyn briwydd *Hyles gallii*.

Ym Mehefin 1888, boed yn ganlyniad i sychder

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Gwalchwyfyn briwydd
Hyles gallii
(hawkmoth)

Glöyn y llwydfelyn
Colias croceus
(clouded yellow)

Roedd poblogaethau o loÿnnod a gwyfynod yn amrywio'n fawr fel ymateb i'r tywydd eithriadol

1887 neu wanwyn oer 1888, neu gyfuniad o'r ddau, gwelwyd pla o lindys gwyfyn y gaeaf yn dinoethi coed ffrwythau yn siroedd y perllannau afal. Yn Fforest Sherwood roedd y derw yn ddi-ddail meddai'r *Aberdare Times*, 30 Mehefin 1888 gan ddyfynnu y *Daily News*. Dyma ffenomenon a nodwyd sawl gwaith yng Nghymru yn y ganrif ganlynol (megis 1906, 1979).

Effaith y tywydd ar gymdeithas

Nid am y tro cyntaf yn eu hanes fe drodd pobl at yr Hollalluog yn eu gofid am y tywydd. Cyhoeddodd y *Cardiff Times* "Erfyniad am Wlaw" gan Gowerton Crugfryn, yn ei rifyn 23 Gorffennaf 1887 (dyma'r cyntaf a'r olaf o'r pedwar englyn):

O, Dduw, dod a cawodydd [sic] - i faethu
Twf weithiau i`n meusydd
Gwywder trwy`r sychder sydd
Yn delwi gwyneb dolydd.....
Yn daer gofynwn, dyro - i`r ddaear
Addawo wlith eto,
Amodol wlaw i`w mwydo,
`Nol dy air dihidled o

Yn ôl G. Franklen (1891) (The Meteorology of 1890: Reports & Transactions, Cardiff Naturalists Society) fe ddechreuodd sychder 1887 ar ôl diwrnod Sant Swithin (15fed Gorffennaf) gyda diwrnod braf a phoeth a chawod yn y pnawn yng Nghaerdydd. Lladdwyd dyn gan fellten ym Mynwy ar 23 Gorffennaf a gwnaed difrod i'w dŷ.

"Reports to hand" adroddodd y Weekly Mail (23 Gorffennaf 1887) "from various parts of the Principality state that the long-continued drought is being attended with serious consequences, many residents in rural districts having to walk long distances for water, while several slate mines and other works have been compelled to suspend operations. Should the drought continue, many of the works in the Vale of Llangollen, and the industrial districts of Ruabon, will be at a standstill this week."

Cofnododd *Y Gwyliedydd* (Rhyl) ar y 6ed Gorffennaf 1887 yr effeithiau ar dwristiaeth a diwydiant drwy Gymru benbaladr:

".. Troir canoedd o`u gwaith yn Nyffryn Rhondda oherwydd prinder dwfr. Yn Rhyl yma, lle y cyrcha nifer mawr o ymwelwyr iddo bob blwyddyn, mae gobaith o ddigon o ddwfr, gydag ychydig ofal, i`n cyflenwi am ddau fis eto beth bynnag. A chawsom rhyw gawodydd ysgeifn o wlaw ddoe (dydd Llun y 5ed)."

Effaith y tywydd ar y cynhaeaf

Mae'n dra pheryglus i or-gyffredinoli. Tra roedd William Jones, Moelfre, Aberdaron yn "Dechrau tori Gwair yn yr Hendre" mor fuan â'r 24ain Mehefin ac

Donald Hobern CC-2.0-Generic

Dart smotiau sgwar
Euxoa obelisca
(square-spot dart)

Melyn yr ynn
Atethmia centrago
(centre-barred sallow)

Fylamoen CC-SA-3.0-Unported

Populations of butterflies and moths varied greatly in response to the extreme weather.

yn cwyno dim am ei gnwd, cofnododd William Phillips, Brynberian, Trefdraeth, Sir Benfro (yn Saesneg, er mai Cymraeg oedd ei famiaith yn amlwg) ar yr 2il Gorffennaf: *"The land burn up. No grass. No water,"* ac ar yr 8ed Gorffennaf: *"...warm. Hot wind. South east wind. Thundering at evening and raining. We had Park twad* [Parc Tywod?] *hay in today. Penberglog Cart was here enough of people. The 2 Carpenter was here and they been help with the hay"*

Barnwyd bod y "... cnwd ceirch dros y wlad yn rhesymol o bell yn ôl, a hyny oblegid diffyg gwlaw, yn gymaint felly, fel y mae amaethwyr yn Scotland, am fod y cnydau yn fyr i'w medi, yn anfon eu da i'r meusydd ceirch i'w pori" er fod "y gwres yn foddion i aeddfedu yr yd, ac i ddwyn y cynhauaf rhagddo yn llawer cynarach nag arferol, ond y mae diffyg mawr yn swm y llysiau a'r ffrwythau. (*Y Dydd*, 18 Awst 1887).

Y cynhaeaf gwenith a thatws oedd yr unig gnydau oedd yn fwy nag arfer a chollwyd llawer ar gig, llaeth, ymenyn a chaws oherwydd y sychder. (*Pembrokeshire Herald and General Advertiser*, 30 Rhagfyr 1887).

Y sychder (meteorolegol) yn darfod

Yn ôl y *Weekly News* daeth y sychder i ben gyda'r glaw mawr a ddechreuodd am 6 o'r gloch, 16eg Awst yng Nghwrt y Fil, Penarth. Heb os, cafwyd terfysg dinistriol a marwol mewn sawl man megis Mynwy, Casgwent, Llundain, Wolverhampton a Phlymouth. Cafwyd trwch o genllysg yn Rhydychen gan ddifrodi'r cnwd ffrwythau. (*Weekly Mail*, 20 Awst 1887). Adroddodd y *Cardiff Times*, 3 Medi 1887 *"...at night an unusually heavy thunder-storm prevailed over North Wales, after a very close and sultry day."* Barnodd gohebydd y papur hwnnw bod yr *"... atmospheric conditions generally would seem to warrant the assumption that the time has arrived for writing the history of one of the most memorable droughts on record."*

Bwrw golwg nôl ar dywydd 1887 a'i effeithiau – adroddiad o Sir Benfro

Dyfynnodd y *Tenby Observer,* Mawrth 1888 anerchiad gair-am-air blynyddol hirfaith, dysgedig a thechnegol Is-lywydd y Pembrokeshire Naturalists' Field Club, y Parch. Clennell Wilkinson. Yn nodweddiadol o'i gyfnod, offeiriad Anglicanaidd oedd Wilkinson, yn hyddysg yn y gwyddorau maes - roedd wedi cymryd mesur trylwyr o flwyddyn sychaf y ganrif. Nododd na fu'r sychder yn gyfyngedig i'r flwyddyn honno:

"Before the summer [1887] had set in the drought had taken such hold upon the land that healthy vegetation was retarded, and even now [Chwefror 1888] we are suffering from want of moisture. It is

generally reported that the springs are so low that a water famine is likely to occur, worse than any we had last year."

Roedd blwyddyn y Jiwbili meddai, yn anarferol o braf gyda llai o law nag a gafwyd ers llawer dydd. Serch yr heulwen ni ellid dweud i'r tymor fod yn boeth, a bu'r nosweithiau yn syndod o oer, hyd yn oed ym mis Gorffennaf. Dyfynnodd Wilkinson ddata Dr Propert o Dŷ Ddewi mai ond 25 modfeddi (635mm) o law a ddisgynnodd yno dros y flwyddyn. Gellid disgwyl, meddai, y byddai blwyddyn o'r fath yn gynhyrchiol i rai a astudiai'r gwyddorau naturiol. Tybiodd mai'r cyferbyniad rhwng gwres y dydd a ias y nos a barodd i 1887 fod y flwyddyn waethaf erioed i wyfynod a glöynnod byw. Yn groes i lawer o'r blynyddoedd blaenorol ni chafodd glöyn y llwydfelyn *Colias croceus* (mewnfudwr rheolaidd o'r cyfandir) ei gofnodi a gresynnodd na chafwyd cofnod y flwyddyn hon chwaith o'r mewnfudwr prin o'r UD, sef glöyn y llaethlys *Danaus plexippus* (bachgen o Lyn Nedd a gofnododd y glöyn yma am y tro cyntaf erioed ym Mhrydain 11 mlynedd ynghynt), ac yn amlwg bu disgwyl i'r tywydd anarferol gyflwyno eraill i dde Cymru y flwyddyn hon.

Mae cymharu niferoedd y gwyfynod rhwng 1887 a heddiw yn anodd. Nid oedd trydan ar gael ar y pryd, ac felly nid oedd y fath beth â thrap golau. Er engraifft, ystyriwyd bod *Atethmia centrago* (melyn yr ynn) yn wyfyn prin iawn bryd hynny, sydd yn groes i ganfyddiad gwyfynwyr yr oes hon, gyda'u trapiau golau trydan. Cofnododd Jaeger, gŵr o Lundain a fu'n aros yn Saundersfoot, rhai gwyfynod yr ystyriwyd yn brin ar y pryd megis *Stilbia anomala* (llwyd gloyw: daliodd ragor nag 20 ar noson ddiwedd Awst ger Roadwood, llawer mwy nag a gafwyd o'r blaen); Euxoa obelisca (dart smotiau sgwar), *Standfussiana lucernea* (dart y creigiau), *Actebia praecox* (dart llwydwyrdd: dim cofnodion yn ein cyfnod ni ym Mhenfro). O blith cofnodion Wilkinson ei hun cafodd am y tro cyntaf (ar y pryd) ym Mhenfro sbesimenau hardd o *Xylena vetusta* (y cleddwyfyn coch).

Ym mis Gorffennaf y flwyddyn ganlynol, fel petai i gau pen mwdwl ar gyfnod eithriadol yn hanes tywydd y 19eg ganrif, cafwyd eira anhymhorol o Gymru i Ynys Wyth.

Dim ond un engraifft o dywydd anarferol yw sychder 1887. Gall cofnodion cyfoes fod yn werthfawr i fodelu newidiadau hinsoddegol drwy dynnu data ynghyd am fyd natur a dwysedd ac amledd digwyddiadau o'r fath. Y mwya'r data, y mwya dibynadwy y canlyniadau. Gawn ni ymbil, felly, am gofnodion tywydd hanesyddol a diweddar ar gyfer cronfa'r Tywyddiadur sydd bellach yn cynnwys bron 100,000 o gofnodion ac yn profi'n gynyddol werthfawr i'r rhai sy'n astudio tueddiadau'r hinsawdd dros y dair canrif ddiwethaf.

*Bu **Duncan Brown** yn warden gwarchodfeydd natur gyda Chyngor Cefn Gwlad Cymru a chyn hynny gyda'r Chyngor Gwarchod Natur. Ers ymddeol bu'n canolbwyntio ar ffyrdd o weld y byd naturiol trwy ffynonellau lleol a thrwy bersbectif hanesyddol. Mae'n olygydd Prosiect Llên Natur ar ran Cymdeithas Edward Llwyd.*

*Mae **Twm Elias** yn gysylltiedig â nifer o brosiectau amgylcheddol / cymunedol, gan gynnwys Cynefin a Chymuned a Llên Natur. Arferai fod yn ddarlithydd ac yn drefnydd cyrsiau ym Mhlas Tan y Bwlch, Canolfan Astudio Parc Cenedlaethol Eryri.*

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Welsh weather records – the 1887 drought

Y Tywyddiadur is part of the Llên Natur project which documents the relationship between people and the natural environment. 1887, the year of Queen Victoria's jubilee, was especially noteworthy as the driest of the 19th century. Several major fires damaged valuable stocks of young grouse, though later there were abundant grouse and partridges on the moorlands. Ponds at Brymbo dried out so much that the dead trout floated on the surface. Farmers were wary of plagues of insects such as the Hessian fly but, despite the sunshine, the air was surprisingly cold and it was a bad year for moths and butterflies.

David Tipling (rspb-images.com)

Common terns at Shotton - a Welsh success story

There was good news in 2014 from Shotton, Flintshire, home of the largest common tern colony in Wales: birds successfully bred, with a minimum of 445 chicks fledging, for the first time since the colony failed to breed in 2009. The Merseyside Ringing Group has been involved with the colony from its inception 45 years ago. Group member PETER COFFEY explains the development of the colony and its significance nationally, explores why the colony failed to breed, and describes what has happened since.

Common tern *Sterna hirundo* Môr-wennol gyffredin

Common terns *Sterna hirundo* were first reported breeding in the Dee Estuary in 1918 on rapidly growing saltmarsh off Burton Point. By 1934, 50 pairs were present[1] and a small colony, varying between 10 and 80 pairs, maintained a tenuous foothold up to 1970. Breeding success was often poor, mainly because nests would be flooded on any high tides exceeding 9.2 metres.

Members of the Merseyside Ringing Group (MRG) noticed that pairs of common terns had occasionally attempted nesting on bunds in the cooling lagoons at Shotton Steelworks. In 1970, at the request of the group, the British Steel Corporation declared the lagoons and surrounding reedbeds a nature reserve. They also granted permission to anchor a hastily constructed raft (4 metres square) in one of the pools to see if common terns would nest there. It was an instant success: 12/13 pairs nested and 17 chicks were ringed and fledged. The group received the Prince of Wales Award for conservation in 1971 in recognition of its efforts in establishing the reserve.

Image (c) 2009 Google, Bluesky, Infoterra Ltd, COWI A/S, Europa Technologies and Tele Atlas

The three nesting islands are clearly visible in this aerial shot

That importance is reflected in its status as an interest feature in both the Dee Estuary Special Protection Area (SPA) and Shotton Lagoons and Reedbeds SSSI, which carry conservation objectives to maintain the feature in favourable condition. The common tern is now an amber-listed species of conservation concern because of the localisation of its population, at least half of the UK breeding birds being found in ten or fewer sites[3].

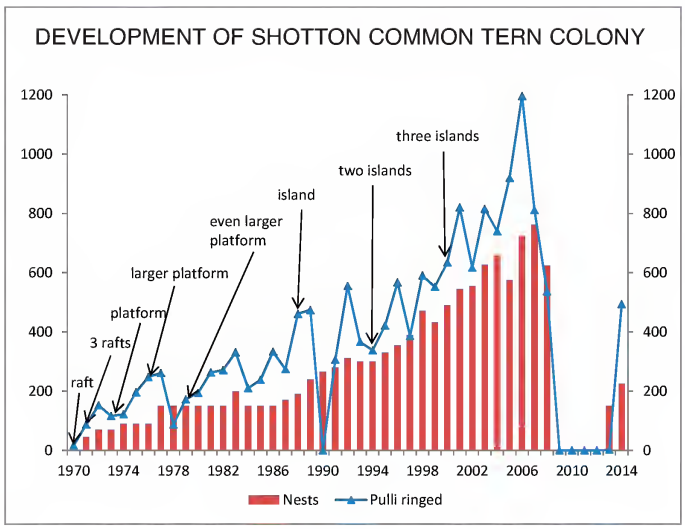
Abandonment of the colony

Abandonment of long-established tern colonies occurs irregularly but is not exceptional. At Shotton, the colony had previously failed once before, in 1990, but on that occasion birds had started to breed, laying 715 eggs by 27th May. However, the colony was abandoned in June; examination showed that eggs had not been incubated to embryo stage. Research showed that other tern colonies in the Irish Sea had been affected and there had been a widespread collapse of small fish numbers.

Development of suitable nesting areas continued over the years to meet the demands of an ever-increasing colony and to develop solutions that required lower annual maintenance. Small floating rafts were replaced by a larger, fixed wooden platform, which was subsequently extended twice, and then replaced by the creation of an island out of one of the bunds projecting into the lagoons. By 2000, three islands had been created and the colony peaked in 2006 with 722 apparently occupied nests and a minimum of 967 fledged young. Amazingly, all this activity occurred just 100m from the steelworks buildings and roads.

National significance

The colony became a key feature of the avifauna of the Dee Estuary and nationally. Common tern colonies in Wales are restricted to Anglesey and Shotton, the latter being by far the largest. It was in the top five colonies in the UK, accounting for up to 5% of the British population. Shotton also had relatively high productivity, regularly fledging more than one chick per pair, compared to productivity for the UK of 0.3-0.8 chicks per pair[2].



In 2009, parties of up to 70 terns visited the islands between mid-April and mid-May, but few nest scrapes were made and only four eggs were laid. MRG considered that one year of failure to breed was of concern but not alarm. In 2010, up to 500 adults returned and appeared to be settling on the islands. However by 22nd May they had disappeared; inspection of the islands showed 150 scrapes but only one egg had been laid. Birds appeared keen to breed but conditions in the Dee Estuary cannot have been favourable. The closest colony, Seaforth at the mouth of the Mersey Estuary, struggled for an entirely different reason – birds nested, but severe overcrowding following an influx of birds from the Dee in the last week of May resulted in the loss of many eggs and a greatly reduced number of fledged young[4]. Checks at other tern colonies in north Wales showed that those colonies had successful seasons in both 2009 and 2010. That set the alarm bells ringing!

Possible reasons for the abandonment

Analysis of conditions at the nesting islands found no material change over the previous five years, but assessment of the wider environment of the Dee estuary was more challenging (see Box). Lack of food was identified as the most probable cause for the abandonment of the colony, despite the absence of hard evidence.

Hugh Pulsford

Recently hatched common tern chick with second chick breaking through its eggshell, Shotton

Assessment of conditions in the Dee estuary 2008-12

Four factors were examined:

- Water quality: the Estuary is regularly monitored to fulfil the Water Framework Directive and Shellfish Waters Directive, alongside opportunistic reporting of apparent incidents. No algal blooms or major pollution incidents were recorded in 2008-10 and, generally, water quality is higher now than three decades ago.
- Fish: the Dee estuary is an important fish nursery for many species and potentially a good source of small fish, the preferred prey of common terns. Liverpool Bay area is an important spawning ground for sandeel *Ammodytidae*[5] but no data are available to show if, and when, the sandeel population in the Dee estuary declined.
- Dredging operations: fish can be affected by increasing turbidity or changing the nature of sedimentary deposits in spawning grounds. Dredging occurs at two locations: (i) at Broughton, six kilometres upstream from Shotton, where, since 2007, a small amount of material is dredged daily and deposited immediately back into the river using a spraying action known as 'rainbowing'; (ii) a much larger operation at Mostyn Docks, removing material from the port access channel and depositing it in Mostyn Deep.
- Flood waters: in exceptional circumstances, floods can lead to scouring of the channel leading into the estuary. The very wet weather in 2007, with rainfall totals in the Dee valley 250% above average, created those conditions.

Looking back, the warning signs were there. Whilst the number of apparently occupied nests rose 55%, from 491 in 2000 to 762 in 2007, productivity fell significantly:

- the mean clutch size declined from 2.65 eggs in 2000 to 2.23 in 2008; and
- from 2000 onwards, the five-year average chicks per pair index fell below 1.34, the baseline specified in the Dee Estuary SPA that needs to be

met to maintain favourable condition status.

Could the feeding demands of increasing numbers of breeding terns have depleted their food supply to an unsustainable level?

Hoping for a recovery

So was there any cause for optimism? Three characteristics of common terns provided some: they are long-lived, many surviving for more than 20 years; breeding adults tend to be loyal to their colony, returning each year; and adults choose not to breed if they are not in good condition – they would rather avoid the stress and return the following year.

Waiting and watching

Only natural processes would determine whether or not sustainable fisheries could re-emerge. The nesting islands were repaired and weeds cleared ready for potential breeding. But MRG wanted to learn more about common tern behaviour in the estuary and at the colony. This was done by conducting boat and land-based surveys across the estuary and by installing cameras capable of recording day and night-time activity on the nesting islands. The results are summarised in Table 1.

Richard Birch

The three islands of the Shotton colony in the midst of the steelworks

In 2011 and 2012, courtship displays and mating were observed but birds spent long periods away from the colony loafing on sandbanks. Reassuringly, the terns used the nesting islands for roosting in 2012 but fish cannot have been abundant enough to encourage breeding. That changed in 2013 but predation by fox, the first case ever recorded at Shotton, meant waiting for another year for success. Fox-deterrent fencing was erected around each nesting island in the winter 2013/14 to prevent further attacks.

Foraging distances for common terns are important because, unlike most other seabirds, they do not

Table 1: Common tern activity in the Dee Estuary and at Shotton, 2011-14

Year	Estimated population (individuals)	Average foraging distance from Shotton	Period present	Activity at Shotton
2011	500+	7.0 km	25 Apr-17 May 2-5 June	Sporadic visits only. Maximum 150 terns on 5 Jun. No breeding recorded.
2012	400+	5.0 km	8 May-12 Jun	Night-time roosts on 20 out of 23 nights between 21 May and 12 Jun. Peak activity at high tides greater than 8.5m. Daytime visits were of short duration. Fewer than 10 eggs laid.
2013	400+	4.5 km	19 May 1 Jun-16 Aug	Nesting on all three islands. Fox raid 16 Jun – all nests abandoned. Approx. 250 adults stayed but only 40 new nests started. 23 July 2nd fox visit. Colony abandoned except for two pairs feeding chicks. Two chicks fledged.
2014	450-500	3.0 km	30 Jun-1 Sep	Nesting on all three islands. No predation. Estimates of 605 eggs yielding 550 chicks, of which 445 fledged. First opportunity to monitor foraging activity by adults with chicks to feed; very high feeding success rate (>50% - ie more than one feeding dive in two is successful - sometimes up to 75%) followed by immediate departure to colony. Only one tern recorded feeding more than 8km away.

collect multiple prey items in their bills or gullets; they return with just one item. Recent studies suggest the average foraging distance for common terns is 4.5km[6]. The average foraging location shown in Table 1 represents the distance from Shotton; in 2011-12 birds were loafing on sandbanks closer to the feeding areas and chose not to fly to the nesting islands. In later years, as the availability of prey items improved, the average distance shortened from 7.0 to 3.0 km and in 2014 birds were recorded regularly upstream from the colony for the first time since 2008.

A strong recovery

After four blank years with no attempted breeding, and one false start in 2013 disrupted by fox predation, 2014 finally brought success. Fortunately breeding conditions were excellent – benign weather, no predation and abundant prey enabled 445 chicks to fledge. No accurate nest counts were made during the breeding season but calculations against a variety of assumptions show that there were 420-500 breeding birds with the chick per pair index at 1.80-2.15, well above the 1.34 threshold. MRG will continue to survey the Dee Estuary and monitor breeding performance, checking for those warning signs that the colony is under stress again. Let's hope that 'our' colony, now in its 45th year, and back as the largest in Wales, will prosper for many years to come!

Acknowledgements

MRG wish to thank Tata Steel UK for their continued support for the Shotton colony; Natural Resources Wales (NRW) for their financial support; and Dee Wildfowlers and Wetland Management Club for work maintaining and fencing the islands. Special thanks to Steve Hughes (Tata), Matthew Murphy (NRW), Keith Marland (Marland Marine Services) and Kenny McNiffe (MRG) for help with boat surveys and work improving the nesting islands. Finally, thanks to MRG colleagues, past and present, who, over the years, have dedicated enormous amounts of time and effort to ensure common terns thrived at Shotton.

***Peter Coffey** joined MRG in 1983 and continues bird ringing with the group today. He is also a trustee of Dee Estuary Conservation Group.*

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Richard Birch

A common tern resting on one of the old scaffolding poles originally used to support the nesting platform in the early stages of this colony's development

Llwyddiant y fôr-wennol gyffredin

Arferai llwyddiant bridio fod yn gyfyngedig yn achos nythfa fechan o fôr-wenoliaid cyffredin ar safle peryglus yn Aber Dyfrdwy. Fodd bynnag, diolch i ymdrechion Grŵp Modrwyo Glannau Merswy (MRG), cafodd nifer o ynysoedd nythu artiffisial eu creu ym mhyllau oeri gwaith British Steel yn Shotton –sydd wedi bod yn hynod o boblogaidd. Bu MRG yn monitro llwyddiant yr adar, ond hefyd yn astudio'r rhesymau dros y methiannau bridio dramatig yn ystod ambell flwyddyn. Credir mai'r rheswm am y rhain oedd prinder ysglyfaeth o fewn pellterau addas, gan na fydd môr-wenoliaid cyffredin yn bridio os bydd stociau pysgod yn isel. Credir bod treillio a llifogydd hefyd yn cyfrannu at newid yr amgylchiadau sy'n addas ar gyfer pysgod mân. Un flwyddyn dioddefodd y nythfa hefyd o ganlyniad i lwynogod ysglyfaethus.

Nathan Walton

Teifi Marshes nature reserve - from water shrew to water buffalo

Looking across Teifi Marshes reserve towards Cardigan town

Teifi Marshes nature reserve was first introduced to Natur Cymru ***readers back in the autumn of 2004 (issue 12). Still under the management of the Wildlife Trust of South and West Wales, the reserve has changed considerably since then. NATHAN WALTON brings us up to date with the management of this special site and its habitats and species, and explains why it is one of Wales's most important wetlands.***

The Wildlife Trust of South and West Wales (WTSWW) has had a long-standing interest in the Teifi Marshes because of their wide range of habitats and associated species. The Trust was able to purchase the site (the old Cardigan Wildlife Park) in 1992 and then raised funds to build the Welsh Wildlife Centre. This award-winning glass and timber structure, opened in 1994, has panoramic views over the reserve and the river Teifi, extending to nearby Cardigan and the surrounding woodland. It houses a café and shop, and an interpretation centre describing the natural and social history of the marshes. The reserve totals about 110 ha, of which 75% is a Site of Special Scientific Interest (SSSI).

Stuart Hall

The Welsh Wildlife Centre

Teifi Ringing Group

Juvenile willow warbler netted at the Constant Effort Ringing Site

The SSSI

The bulk of the marshes, meadows and woodland lie within the Coedydd a Chorsydd Aberteifi (Teifi Estuary Woodlands and Marshes) SSSI. Notified principally because of its botanical interest, the SSSI also includes the Coedmor Woodland National Nature Reserve on the opposite (Ceredigion) bank of the Teifi, which is owned by Natural Resources Wales.

Main habitats

Alder carr

Carr is wet woodland, here dominated by willow and alder. Most is mature in age and is an almost undisturbed wilderness – a tangle of woody species and shade-tolerant herbs. These areas are damp with an abundance of ferns, mosses and liverworts, while lichens and fungi grow on branches and dead wood. It is a safe haven for a variety of birds such as Cetti's and willow warblers and for numerous invertebrates. Otters have a holt in one of the larger remote stands and can be seen using the numerous areas of open water throughout the year, very often with cubs during summer months. Important communities of alder trees with characteristic swampy ground conditions and large tussock sedges can also be found, often at the edges of the marshes.

Mature carr is left unmanaged to prevent disturbance, but younger areas along the edges are coppiced to create a softer transition from wetland to woodland. Less valuable areas of carr woodland are cleared, especially when they encroach on the reedbeds. In wetter areas individual trees are injected with herbicide to prevent further growth, but still provide standing dead wood for invertebrates and, in turn, food for species such as the lesser spotted woodpecker.

With increasing numbers of ospreys migrating up the west coast of Wales, every spring one or two stop off on the Teifi for a few days. We have therefore installed a nesting platform on the edge of the main carr habitat, in the hope that, in time, an osprey will take up the offer of a free nest site and soon a breeding pair will follow. This iconic species would be a fantastic addition to the reserve, and would give us the opportunity to repeat the success that Montgomeryshire Wildlife Trust has had at its Cors Dyfi Nature Reserve.

Lagoons

There are four permanent lagoons on the reserve and others which are transient in nature. They are filled from two sources: the Teifi overtopping a sluice from the Rosehill Marsh when tides are high, and a small branch of the Piliau flowing in from the freshwater Pentwd Marsh when water levels there rise. In summer and autumn the tidal feed dominates and the salinity increases, while in winter and spring the freshwater flow is more important and the salinity falls. The lagoons vary in depth and are full of eels and small fish, attracting herons, otters and kingfishers.

Large numbers of wildfowl use these areas of open water, especially during winter months when water levels are at their highest. Teal, mallard, wigeon and mute swans are regular sights, with water rails present in good numbers along the margins; grass snakes can also be seen gliding through the water.

Two artificial banks are currently being installed beside one of the larger lagoons to attract sand martins. A local colony in a nearby quarry is under threat from the expansion of quarrying activities, while the banks of the Teifi are unsuitable for nesting because of fluctuating water levels and erosion.

Meadows

The wetter meadows are herb-rich and contain species such as water plantain, water mint, ragged robin, red bartsia and gypsywort. In winter these flooded areas attract large numbers of winter wildfowl and lapwings, while in spring breeding snipe are present. Water shrews are also found here and sika deer are regularly seen grazing. Ponies help manage these areas in winter.

The dry, unimproved meadows are full of flowers that include rough hawkbit, common knapweed, yellow-rattle and oxeye daisy. On a fine summer day these meadows are full of butterflies, hoverflies, bees and many other insects. Twenty-six species of butterfly have been recorded on the reserve, including healthy populations of white-letter hairstreak, brown hairstreak and holly blue. Although these last three species need woodland or scrub for egg-laying, the diversity and abundance of the meadow flora is undoubtedly important for these and other invertebrates. For instance many woodland moths fly to the meadow to feed, including several scarce species such as the dotted carpet, double kidney and white-line snout. The hornet robber fly, a species of vulnerable status in Britain, preys upon grasshoppers in the meadows. Further meadow restoration work continues with the sowing of local, native wildflower mixes. The grass is cut and collected at the end of March, and again in late August after the flowers have seeded.

River

The Teifi Marshes are situated in a wide, pre-glacial channel that was originally forged by the river Teifi. Now the river runs along the edge of the nature reserve and then widens as it enters the estuary. The much smaller Piliau rises in the Llantood area nearby and meanders through the reserve. It has created its own deep channel which can be seen from various viewpoints.

The Teifi and some of its tributaries are

Nathan Walton

Yellow flag in the wet meadows

designated as a Special Area of Conservation because of their habitats and the species which live in them, including some which are threatened or endangered both in a UK context and on a European scale. Apart from its stocks of salmon, sea trout and brown trout, the river is also home to other fish species including brook and river lamprey. The gravelly nature of parts of the river bed are particularly favourable for spawning lampreys, and the smaller tributaries can provide a safe haven when the river is in full spate – a relatively common occurrence. Bullheads, rarely if ever seen in most parts of Britain and mainland Europe, are also plentiful in fast-flowing sections of the Teifi. The otter is another species listed in the SAC designation.

The river has areas of unvegetated mudflats which provide a feeding or roosting area for many birds, particularly dunlin, oystercatcher, curlew, teal, mallard, cormorant and wigeon. Sea club-rush colonises areas of bare mud, succeeded by typical middle and upper saltmarsh communities.

Woodland

Woodland on the reserve is predominantly sessile oak, much of this being found in the steep-sided Teifi gorge, which runs upriver from close to the Wildlife Centre. This area has remained untouched for over a century. The tree-lined sides of the gorge slow the

Tommy Evans

Otter with a lamprey on the Teifi river bank

Nathan Walton

Water buffaloes wallowing in the freshwater Pentwd Marsh

flow of moisture-rich air and create very humid micro-climates – ideal for mosses and lichens, with approximately 170 species recorded to date. As well as oaks there are also small-leaved lime, wild service and wych elm, and exceptionally large examples of a grass, wood millet. The path through the woodland gives spectacular views of the river.

Although less exciting ecologically than the woodland along the gorge, the other woods on the reserve still have some interesting features. There are many very old trees, but also signs of past management. Patches of coppiced oaks are evidence of felling about a century ago; the lay-out of coppiced hazel groves suggests that these were planted. More recently, lack of management has produced areas with a high closed canopy; the result is a poor summertime ground flora, a sparse shrub layer and little tree regeneration. However, coppicing is still performed where access and terrain permit, helping to provide a variety of structure in the woodland. In spring, before the trees are fully in leaf, this woodland is a mass of bluebells, campions, wood anemones, celandines, primroses and stitch-worts. It is a good place to see nuthatch and pied flycatcher which nest in the bird boxes, and purple hairstreak butterflies flitting through the canopy. Two small herds of deer, one of red deer, the other of sika, also roam these woods, emerging to graze the adjacent meadows in early morning or evening. There are concerns that the red and sika are beginning to hybridise, as has happened widely elsewhere. Deer are not seen to be of a real concern to woodland management so far, but we work closely with the Wales Deer Initiative to monitor numbers and impacts.

Boxes have been provided on the woodland edge for barn and tawny owls, with the former hunting for field voles in the surrounding meadows. In 2014 three young tawny owls provided visitors with some special photo opportunities.

Marshes

There are two main areas of marsh, Rosehill and Pentwd. Rosehill Marsh is a rare example of an estuarine transition mire, containing an extensive reedbed, an area of open water, a purple moor-grass fen and a small developing alder carr. Dotted sedge, which has a very limited distribution in coastal Britain and Ireland, occurs here. The reedbed is managed by a local master thatcher (Alan Jones – Pembrokeshire Thatch and Carpentry Services) who cuts and collects the same area each year whilst also undertaking 'conservation' cuts elsewhere to maintain the health of the reedbed. Without this work the ground would soon dry out and revert to wet or scrubby woodland. The reedbed supports a good number of bird species such as reed and sedge warblers and reed buntings, while in winter bittern, jack snipe and roosting starlings occur. The Teifi Ringing Group runs a Constant Effort ringing site here for the British Trust for Ornithology during the breeding season, producing valuable data on changes in bird populations and breeding success.

The freshwater Pentwd Marsh has been managed through summer grazing with water buffalo since 2003. These animals are ideal conservation tools, maintaining and enhancing this wet habitat better than any other grazing animal. They do an excellent job keeping areas clear of invasive plants such as willow scrub, gorse and reed mace, which in turn helps to maintain the habitats favoured by many native and migratory birds. The buffalo like nothing better than wallowing, thus creating depressions and ponds which are a perfect habitat for invertebrates such as damselflies and dragonflies, along with amphibians such as toads and newts. These in turn provide a food source for otters, as well as herons and little egrets.

Slate waste

Another feature of the reserve is an industrial spoil heap, covering 3ha with a 5m layer of mudstone/slate waste from the quarries in the river gorge. Quarrying ceased over 100 years ago; since then erosion and accumulation of wind-blown dust and organic matter have provided a thin soil. This local slate is slightly alkaline, so the soil is 'base-rich' and supports the growth of lime liking plants such as English stonecrop, orpine, carline thistle, traveller's joy and rusty-back fern.

Howard Jones

Grass snake warming up on the slate waste area

In addition, the mixture of bare slate for basking and scrub for cover provides excellent habitat for invertebrates and their predators including grass snakes, slow worms and lizards. Management here involves reducing the amount of scrub cover to maximise the area of slate/scrub interface. This will also provide habitat for early pioneer plant species, which quickly become shaded out by scrub encroachment.

The Future

The Wildlife Trust actively encourages people to visit Teifi Marshes and tries to demonstrate what the Wildlife Trust does and why we do it. The reserve attracts over 30,000 visitors a year, ranging from keen naturalists to day trippers. It is a place for all seasons, each showing off a wildlife spectacle of some sort with always something to see. Impressive willow sculptures, an adventure playground, improved interpretation within the visitor centre and a good number of trails and footpaths all add to a visitor's enjoyment of the reserve.

There are always financial constraints on how much management work can be done. A recent bonus has been provision of BIFFA Award funding for a temporary ranger to help with reserve tasks. These have included further creation of wildflower meadows, coppicing and thinning woodland, invasive species control, and the planting of a traditional Welsh orchard.

Public access does have a potential impact upon the nature conservation features of the site and we control this by restricting access to a network of paths and hides. Nevertheless, we hope that people will leave our Teifi Marshes reserve with an appreciation of their natural environment and the wildlife it contains.

***Nathan Walton** is South and West Wales Wildlife Trust Officer for Pembrokeshire and reserve manager of Teifi Marshes NNR.*

Nathan Walton

Alan Jones cutting reed for thatching

Corsydd Teifi

Rheolwyd gwarchodfa natur Corsydd Teifi gan Ymddiriedolaeth Bywyd Gwyllt De a Gorllewin Cymru er 1992, ac y mae'n un o gorsydd pwysicaf Cymru. Mae'n cynnwys sawl cynefin cyfoethog ac amrywiol, megis gwernydd, dolau gwlybion a sychion, coetiroedd, dwy afon ac, wrth gwrs, y corsydd eu hunain. Mae'r cynefinoedd hyn yn noddfeydd i lawer o rywogaethau bywyd gwyllt - adar, pysgod, anifeiliaid di-asgwrn-cefn, planhigion, ffyngau a brÿoffytau, sy'n gartref i gyfoeth mawr o fywyd gwyllt. Ni chyffyrddwyd â rhai rhannau o'r coetir ers rhagor na 100 mlynedd, a phrysgoedir rhannau eraill er mwyn atal tarfu. Mae'r ychen afon sy'n pori yno'n gymorth i reoli amryw gynefinoedd.

Andrew Graham

The Argent and Sable moth

and its association with bog myrtle in Wales

Argent and Sable is a handsome day-flying moth with a very limited distribution in England and Wales. ANDREW GRAHAM describes its association with bog myrtle, and encourages other naturalists to find new colonies by doing some detective work outside the moth's flight season.

Bog myrtle *Myrica gale* is a plant with a distinctly western distribution in Wales. It is quite widely distributed in north-west Wales and also occurs in the South West, particularly on Mynydd Preseli and Gower. In Merionethshire it occurs in coastal bogs and throughout the Rhinogs and Moelwyns, but is absent from apparently suitable habitat further inland. This sharp cut-off seems curious as transplants do thrive further east and, in fact, the plant is known from a few sites much further to the east, in Shropshire. Despite this restricted distribution there are still extensive areas in north-west Wales where bog myrtle is dominant, including parts of the Anglesey Fens, various sites on the Llŷn Peninsula, and considerable areas in Snowdonia proper. Unfortunately there are also many sites where the impacts of agriculture and forestry have either completely eliminated the plant or reduced it to a stunted twiggy growth. This loss has the knock-on effect of eliminating those invertebrate species that are entirely dependent on bog myrtle (the obligate associates) and of reducing populations of those that are also

able to utilise other plants (facultative associates).

Many of these associated species are lepidopteran, the most notable surely being the Argent and Sable *Rheumaptera hastata*, a spectacular, black and white, day-flying macro-moth which is a UK Priority Species for conservation action. Now very localised in England and Wales, its recent rediscovery in north-west Wales is significant in UK terms. Although there are 19th and 20th century records from scattered localities across north Wales, there were no sightings for over 30 years until the discovery of a colony near Trawsfynydd in 2010. Since then two further colonies have been discovered, one just north of Llyn Bodgynydd in Gwydyr Forest in 2012 and the other a few miles south-west of the Trawsfynydd colony, in 2014. Of course, the moth must have been present at these sites all along but had simply been overlooked. Elsewhere in Wales the moth has been recorded post-2000 at only two sites, both close to the border; these are Fenn's Moss in Wrexham county and Hendre Woods near Monmouth.

The 2010 discovery resulted from a chance daytime observation of adult moths but it has since become apparent that this is not actually the best way to survey for the species. A more reliable method is to search stands of bog myrtle for larval spinnings. This method obviates the need for sunshine and overcomes the fact that the adults only have a short flight time in May-June and are present at low density. Indeed, in preceding years in the flight season I had twice visited the site of the colony discovered in 2014 without observing a single Argent and Sable adult. On returning in late August 2014, spinnings in the bog myrtle shoots were

Andrew Graham

Argent and Sable habitat near Trawsfynydd

obvious from a distance, and a closer examination soon revealed the presence of the unmistakable larvae.

However, recognising Argent and Sable larval spinnings is not entirely straightforward because there are other species that construct similar spinnings that must be differentiated. There are also a number of moths that feed on bog myrtle without creating a spun-up nest.

Helen Bantock

The distinctive brown leaves caused by Argent and Sable larval spinnings

Andrew Graham

Adult Argent and Sable moth

Argent and Sable

The Argent and Sable is known to utilise two principal foodplants in Britain, birch and bog myrtle. In north-west Wales all the larvae recorded recently have been found on bog myrtle and none, as yet, on birch. According to the literature, the bog myrtle-dependent subspecies *nigrescens*, common in Scotland, has been found previously in north Wales; however, perhaps surprisingly, the moths seen in recent years appear to be of the nominate subspecies which supposedly feeds on birch. The situation is quite confusing and further research is needed. The three colonies known to date are all characterised by having some degree of shelter. The 2010 Trawsfynydd colony is sheltered by an old conifer plantation and the other two are on sloping ground with scattered trees and denser woodland nearby.

Each egg is laid singly, probably on a terminal leaf of a bog myrtle shoot. The spinning made by the larva forms a completely sealed cavity within which it feeds. Internal feeding damage to the leaves causes orange-brown patches to develop, contrasting with the green of any undamaged portions. The frass from the final instar larva is approximately 1mm in diameter and remains within the cavity, accumulating at the base in a characteristic manner. Living within the safety of these spinnings provides the larvae with protection from predators and from parasitoid species of Diptera and Hymenoptera. However, one spinning does not provide sufficient food for a larva to mature, so a move has to be made to another shoot which in turn has to be abandoned when the time comes. The result is that as the larva approaches pupation there will be a cluster of nests of various ages, all in close proximity and usually on one plant. It is these groups of conspicuous orange-brown shoot tips that indicate the presence of the moth.

The larvae of the Argent and Sable can be found from about mid-July through to early September. After the larvae have pupated the relatively large size of the frass in the vacated nests will provide proof of the presence of the moth. It is the frass size that will distinguish the spinnings of the Argent and Sable from that of the following species.

Hedya atropunctana

This micro-moth was known as *Metendothenia atropunctana* until very recently. Its larval spinnings are the ones most likely to cause confusion with those of the Argent and Sable. However, its larvae are quite distinct. Although first instars may be paler, later stages are a dark olive green with black

Andrew Graham

Hedya atropunctana

pinaculae (warts). The nests are constructed from the terminal leaves of a shoot which are fastened together with silk to form a completely sealed enclosure. The frass, therefore, accumulates at the base of the chamber but can be distinguished from that of the Argent and Sable by its smaller size – up to approximately 0.4mm diameter. In addition, the exterior of the spinning tends to remain greener with less of the sharp contrast with orange-brown, dead patches as seen in the Argent and Sable spinnings. The *Hedya* nests also frequently exhibit more of a 'pepper pot' appearance and tend to be less clustered than those of Argent and Sable although, as the *Hedya* is a common moth, a number of nests may sometimes be found on one bush.

There are a number of other moths whose larvae feed entirely or commonly on bog myrtle, and some of these also produce spinnings. However, these can be easily distinguished from Argent and Sable because the spinnings are not sealed at the base, so that frass does not accumulate. In addition, size and colour of these other larvae are clearly different.

Further surveying and the future for Argent and Sable

It is highly likely that more Argent and Sable colonies remain to be discovered so it is hoped that these notes may encourage readers who enjoy exploring wild parts of western Wales to take up the challenge. If they do so and are successful, I would be delighted to hear from them, preferably supported by photographs of the site, spinnings etc. The larvae can usually be identified with little damage to the spinnings although care should be taken to minimise this. So long as the larvae remain on the bog myrtle they can quickly repair any damage, though some larvae do have a very effective escape strategy whereby they wriggle frantically backwards and are then likely to fall to the ground and have difficulty climbing back up to a suitable shoot-tip.

Unfortunately, the site of the rediscovery of the Argent and Sable in 2010 has suffered from agricultural improvement – mowing in this case – so the future of this particular colony looks uncertain at the time of writing. Bog myrtle is a resilient species that will grow back when mown and recovers, in time, even from episodes of heavy grazing; however, it will eventually be eliminated by the constant nibbling of sheep. The plant is certainly not regarded favourably by farmers but it is of crucial importance for the Argent and Sable moth and can certainly also be appreciated in its own right, not least for the wonderful fragrance that can be such a feature of bogs in western Wales on warm summer days.

Jonny Easter

The 'pepper pot' leaves of a *Hedya actopunctana* nest

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Y Brychan Pennau Saethau

Mae helyg Mair *Myrica* yn tyfu'n bennaf yng ngorllewin Cymru ac mae'n blanhigyn bwyd pwysig i larfa gwyfyn o'r enw y Brychan Pennau Saethau *Rheumaptera hastate*. Ceir ambell gytref yng Nghymru, ond mae'r gwyfyn wedi cael ei anwybyddu, o bosibl, gan mai pur anaml y gwelir y gwyfyn llawndwf, ac eithrio ar hap. Ffordd haws o ddod o hyd i'r cytrefi yw chwilio am eu nyddiadau larfal ar ddail helyg Mair. Ar yr olwg gyntaf, mae'r rhain yn debyg i nyddiadau larfal eraill – rheswm arall pam na chaiff y gwyfyn ei gofnodi'n aml. Ond ar ôl eu harchwilio'n fwy manwl, mae yna wahaniaethau clir. Mae'r difrod a achosir y tu mewn i'r plisgyn wrth i'r larfa fwyta yn creu smotiau orenfrown ar y dail wrth i'r larfa fynd yn hŷn.

Richard Outram

Tŷ Newydd: *an environment to write about*

An historic house, where Prime Minister David Lloyd George lived, in a stunning setting rich in wildlife, provides a stimulating location for all sorts of writing about the natural environment. ***ROBERT MINHINNINK*** *reflects on his own experience of the National Writers' Centre of Wales*

It was 1990 and I had never previously been to Tŷ Newydd or Llanystumdwy. First I drove, then walked, around the village, passing the now familiar iron gates several times but believing the entrance private. Yet I needed to find the house. I was a co-tutor on the first ever Tŷ Newydd writing course, along with Gillian Clarke.

Tŷ Newydd was the brainchild of Sally Baker, who had written to me in the 1980s proposing a 'house for writing and writers'. This was to be influenced by the Arvon centres, yet uniquely Welsh. I had redirected her letter to the Arts Council of Wales.

Twenty-five years after our initial course, Tŷ Newydd is celebrating its remarkable development as 'the national writers' centre for Wales'. And as it has broadened its scope, environmental issues have increasingly influenced the annual programmes. Climate change, precipitated by atmospheric carbon, is a vital political and social subject. The Welsh Government felt that a 40% cut in carbon emissions by 2020 was

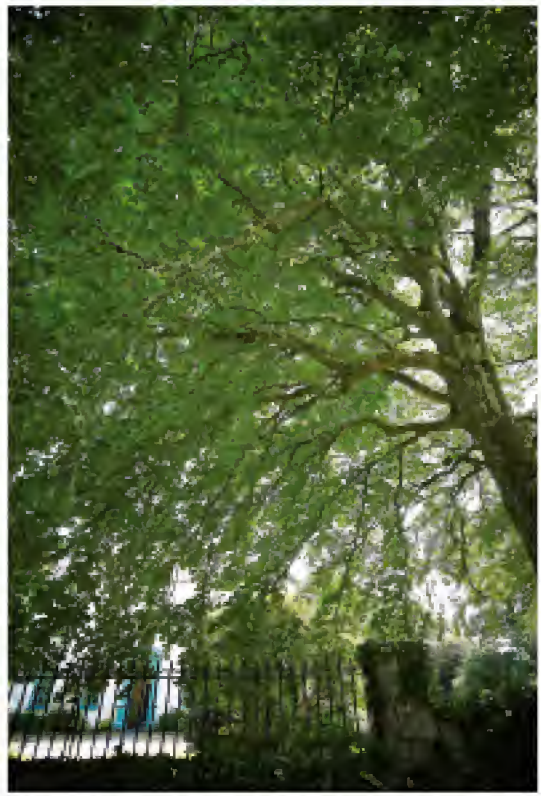
feasible. Such a dramatic reduction is now not possible in this time span, although Welsh Government remains determined to get as close as possible. Moreover, there is constant pressure on politicians in the Senedd, both from their own scientists and from groups such as WWF Cymru, Friends of the Earth Cymru and 'Climate Chaos'.

World of nature

Tŷ Newydd as a house and a writers' centre has always been immersed in the natural world. My guide to the wildlife of this part of Wales was provided by Elis Gwyn, partner of Sally Baker, who had been brought up in Llanystumdwy. Every tutor I have worked with at Tŷ Newydd believes that a consuming interest in local wildlife is vital, and that it is the natural business of tutors and course members to keep eyes and ears open. Any form of writing depends on curiosity.

I remember a dazzling August day in 1995, when the whole of Wales seemed parched and burnt. I watched a bluetit (*titw tomos las*) feasting on a small tortoiseshell butterfly that had become entangled in a spider's web outside the kitchen window, the butterfly almost the size of the bird. On summer courses in pre-dawn hours I'd walk the grounds, noting the first light breaking over Gwynedd and Cardigan Bay and the Tŷ Newydd chickens roosting in low branches to be safe from foxes. I recall a Tŷ Newydd cockerel figuring in many writers' work, and even the titles of anthologies.

Expeditions outside the grounds are always exciting. Tŷ Newydd is surrounded by marvellous coastal and mountain scenery, and it is not far from Cwm Pennant, "the most beautiful valley in Wales", and a popular destination. The adventurous Hilary Llewellyn Williams and I, as course leaders one year, discovered Cwm Pennant was rich in the small brown mushrooms known as 'liberty caps'. These are identifiable by the nipple on the cap's top but, as with any wild mushrooms, you take your chances when harvesting. In Welsh these are known as *bwyd ellyllon* (elves' food), *caws y llyfaint* (frogs' cheese) or *bwyd y boda* (buzzards' food), and have been consumed for as long as we can read back in history. Cwm Pennant is a fruitful place for foragers, and



Richard Outram

foraging has been a constituent part of several Tŷ Newydd courses.

The Afon Dwyfor, which flows through Llanystumdwy and on to the sea, has its source in Cwm Pennant. It's only a short walk from the house down to where the Dwyfor passes thrillingly around enormous glacial boulders. Then it creeps into the sea at Aber Dwyfor, a narrow estuary with pebbles and bright seaweeds.

There are superb panoramas of Cardigan Bay to be viewed from the centre's gardens. It's a delightful walk downhill from the house, crossing the railway bridge (the Aberystwyth-Pwllheli line is only half a mile away) and on to the estuary. The Dwyfor is rare amongst Welsh rivers in that its mouth is unindustrialized – that's why I like it so much. It supports local fishermen, whose boats and nets can sometimes be glimpsed on the gravel shores of the estuary. Elis Gwyn is one of these fishermen. Other frequent sights are cormorants, the striking *bilidowcar*, often to be seen perched on a rock drying their wings.

Much of this coastal area is a Special Site of Scientific Interest (SSSI), designated for its unusual geological features and diverse wildlife. On this area of beach, known as Criccieth West, there can be an abundance of periwinkles, razor shells and peeler crabs. By the end of many visits the bedrooms of tutors and course members are decorated with pebbles, released from the soft boulder clay ('Llanystumdwy till' in the west, 'Criccieth till' to the east), and strands of oarweed and other seaweeds, although this is not encouraged, considering that hundreds of visitors arrive every year.

Changing and unchanging views

The striking, long-chimneyed residence we now know so well was designed by Clough Williams-Ellis, yet there has been a habitation here for hundreds of years. Tŷ Newydd will always be famous as the former residence of David Lloyd George, and is the place where he died in 1945. It's easy to walk to his memorial in Llanystumdwy, and to the Lloyd George museum, almost opposite. Many features of the house and grounds would be familiar to him, not least the extraordinary acoustics of what is now the library, in which even a whisper might echo. Visitors today will find grey squirrels common in the gardens, although Lloyd George might have been more familiar with the native red. But he would have recognized the useful herb, parsley piert (*troed y dryw*) that grows in cracks in the magnificent garden walls.

Lloyd George would have also known the spectacular tulip tree that flourishes close to the house, its leaves like cats' faces. Looking through its branches on a recent visit I was reminded that astronomy has always played a significant part in the work done here. It is wonderful to look south from the library windows at the constellations wheeling over Cardigan Bay. Better still to lie out on the lawns and marvel at the multitudes of stars visible in the unpolluted darkness. From there Llwybr Llaethog (the Milky Way) is visible in all its glory.

The widest panoramas are obtained from Moel y Gest, an imposing local mountain which has figured in several courses, or from Criccieth Castle. Built on a volcanic headland by Llywelyn Fawr, taken and rebuilt by the English and finally destroyed by Owain Glyndwr in the early 15th century, the castle is the perfect destination for a walk along Criccieth West beach from Tŷ Newydd.

It is thought that climate change will bring more erratic and stormy weather. But storms have never been uncommon in this part of Wales. In 1927, strong winds destroyed parts of the promenade at Criccieth. More recently, the two most notable storms to affect Tŷ Newydd have been 'Hurricane Jude', October 2013, and 'The Beast', February 2014, in which trees in the avenue leading to the house were damaged, and the highest ever UK wave was recorded.

Richard Outram

Rising sea levels at Criccieth Castle

The Welsh government has an ongoing strategy when dealing with tidal rising. It consists of four approaches:
Do nothing. This is where the coastline is left alone and no management practices are put in place.
Hold the line. The coastline is held in the location it is at present. Coastal defences are maintained.
Retreat. A decision is made to allow the sea to take over the land and the coast to retreat landward.
Advance. Sea defences are built. The new coastline may even advance outward, pushing back the sea.

For each of these options a cost-benefit analysis studies the cost of each sea defence, and the cost to the area if the scheme is not put in place. Chief scientist at the UK Met Office, Dame Julia Slingo, summarised the UK position on the frequency of storms by saying "all the available evidence suggests there is a link to climate change". Yet the full report makes clear how difficult it is to explicate UK weather.

In the 25 years since the centre opened, global warming and associated tidal rising have become accepted parts of life. Indeed, this period has seen an extraordinary growth in environmental awareness. Nobody who attends Tŷ Newydd today is unaware of these issues, and in fact the centre hosted its first 'green writing' week not long after it opened. Today, courses which include environmental elements are common and it seems certain that the natural world, including climate change, will be the focus of many future courses in the unique setting of Tŷ Newydd.

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Forthcoming nature writing courses at Tŷ Newydd:

Birds, Bees and Flights of the Imagination
Monday 4 – Saturday 9 May
Tutors: Mark Cocker and Rhian Edwards
Explore the wonderful wildlife and landscape around Tŷ Newydd, looking hard into the facts of flight to send your imagination soaring.

Telling it Slant: Writing about Climate Change
Monday 3 – Saturday 8 August
Tutors: Jay Griffiths and Robert Minhinnick
This course assumes an agreement that climate change is a reality and encourages all forms of imaginative writing about this phenomenon, with plenty of time to enjoy the beautiful surroundings of Tŷ Newydd.

Tŷ Newydd is part of Literature Wales, the national company for the development of literature in Wales. Learn more at: www.tynewydd.org

Richard Outram

Canolfan Ysgrifennu Tŷ Newydd

Yn 1990 agorwyd Tŷ Newydd, cyn-gartref David Lloyd George yn Llanystumdwy, fel 'tŷ ar gyfer ysgrifenwyr ac ysgrifennu'. Bum mlynedd ar hugain yn ddiweddarach, mae llu o ysgrifenwyr wedi croesi'r trothwy, wedi'u hysbrydoli gan gefn gwlad yr ardal a llonyddwch ac unigedd y gerddi. Daw'r teithiau i Gwm Pennant, Aber Dwyfor a Chastell Cricieth â'r ysgrifenwyr yn nes at natur, gan roi rhwydd hynt i'w dychymyg. Mae'r arfordir yn yr ardal hon wedi hen arfer â stormydd. Ond er hyn, arweiniodd stormydd Chwefror 2014 at ddifrodi coed y rhodfa sy'n arwain at y tŷ, a chofnodwyd y don uchaf erioed yn y DU. Caiff cynhesu byd-eang a'r llanwau mwy sy'n gysylltiedig â hyn eu derbyn bellach fel rhannau o fywyd, ac mae materion amgylchedd-ol yn cael mwy a mwy o ddylanwad ar raglen flynyddol y cyrsiau. Mae pawb sy'n ymweld â chanolfan Tŷ Newydd yn ymwybodol o'r materion hyn bellach.

Mike Bailey

60 Years Ago - the story of a National Nature Reserve

Once sites of exceptional importance for nature become National Nature Reserves their future should be secure, but the stories behind their protection are seldom told. Acquiring sites is neither easy nor quick; in the case of Cors Fochno, it took more than 30 years and very nearly failed. Here ***PETER WALTERS DAVIES*** *and* ***JAMES ROBERTSON*** *describe some of the twists and turns in the establishment of an NNR.*

Cors Fochno

The central dome of this oceanic raised bog, with its uneven surface of hummocks and hollows, is the actively growing heart of an extraordinary time capsule. The peat formed by the pickled remains of plant growth is up to 7 metres deep and provides an archive of environmental change stretching back over 5,000 years[1]. Cors Fochno is entirely a post-glacial feature, land that has accreted and grown above rising sea levels since the glaciers retreated. It is the definitive estuarine raised mire in the UK: despite extensive drainage reclamation and peat cutting in the past, it retains the largest expanse of primary surface lowland raised bog in Britain[2]. Naturalists and researchers are drawn to the bog because it is home to scarce and specialised fauna and flora. It is also an arresting feature in the landscape, a great stretch of bog, which cannot be missed as you drive along the Aberystwyth to Machynlleth road. As the setting for the third part of the television drama *Hinterland*, this landscape plays a vivid role in the drama.

The first tentative steps to safeguard Cors Fochno, or Borth Bog as it

was then known, were taken in 1952/53 when the Nature Conservancy (NC) notified the Local Authority that the bog was considered to be a Site of Special Scientific Interest. NC also informed all known owners of the land affected by the designation, although at that time SSSI status offered very little protection from agricultural activities.

In 1954 the NC's Mid-Wales Advisory Committee recommended Borth Bog and the other major peatland site in Cardiganshire, Tregaron Bog, as Proposed National Nature Reserves (PNNR) under Section 19 of the National Parks and Access to the Countryside Act 1949. Both sites occupied extensive tracts of peatland which the local agricultural fraternity regarded as worthy of reclamation. When choosing between the two, NC gave preference to Tregaron, mainly because it was in single ownership and had a well-documented scientific history[3]. After concluding a Nature Reserve Agreement with the owner, Lord Lisburne, Tregaron Bog became the first National Nature Reserve (NNR) to be declared in Cardiganshire. The steps leading to declaration aroused much interest locally. The Agricultural Executive Committee representing local farmers, not wishing to see so much land excluded from potential development, raised fundamental objections. NC was then an unknown quantity and treated with suspicion. After much discussion and persuasive argument objections were withdrawn, but with certain reservations which were subsequently conveyed to NC by the County Agricultural Officer, who reported "... should a proposal to establish a National Nature Reserve at Borth Bog be brought before my Committee it would have little chance of being accepted and that resistance would be much stronger than at Tregaron."

This put the Borth Bog Proposed NNR 'on hold'. With just two offices in Wales, at Bangor and Swansea, and no supporting field staff in the area, NC had to conduct all investigations at arm's length. At the time, Borth Bog was still looked upon as an unoccupied 'wasteland', a danger to livestock, and largely disregarded by the local community. As such there were few misgivings that the scientific interest might deteriorate if designation was delayed. Surface fires occurred in most summers, but at the time their damaging effect on susceptible mosses was not fully appreciated. This position changed when two unexpected events caused a radical re-appraisal.

Mike Bailey

The view across Cors fochno towards the Dyfi estuary

A hot potato

Firstly in 1958/59, it became known that a Lincolnshire farmer had acquired land in the area to grow potatoes. Little was known about the nature or scale of this development until a feature article in the *Western Mail* claimed that the farmer expected a bumper crop of potatoes from his reclaimed Welsh fenland. Secondly, the notable Cambridge ecologist Dr Harry Godwin came up with new scientific evidence that Borth Bog undoubtedly merited NNR status. Many other naturalists and ecologists, such as Dr Francis Rose, weighed in, giving solid evidence of the outstanding, undamaged conditions. Added urgency came after discovering the presence of the peat-forming moss *Sphagnum austinii (imbricatum)*. At the time it was thought to have been eliminated from Tregaron by persistent burning, so the continuing outbreaks of fire at Borth were posing a very real threat.

As more evidence of the importance of Borth emerged the Conservancy was urged to act, and by 1961/62 the status of the site had been restored to Proposed NNR. The Conservancy then received a reliable report that 3,000 acres (1,214ha) were being purchased by another Lincolnshire potato-grower, a development which would almost inevitably impinge on the PNNR as it included part of the virgin

All three British species of sundew grow at Cors Fochno

peatland in the wet central core. This put NC under considerable pressure to open negotiations with a view to acquiring the bog. At the time NC had only one Land Agent in England & Wales and he was already fully committed in Wales, negotiating for sites commanding higher priority – Whiteford Burrows, and two Anglesey peatlands. Understandably, he was reluctant to open a new set of negotiations at Borth. After exploring options for making progress it was decided, at the suggestion of the Director-General Max Nicholson, to ask the locally based West Wales Field Society – which had previous experience in acquiring nature reserves in Pembrokeshire – to negotiate directly with the known owners on the understanding that NC would give statutory protection to each acquisition by entering into a Nature Reserve Agreement with the Society.

Liaison

Throughout these developments the Conservancy maintained a close liaison with the various Government departments and Agencies with remits covering reclamation proposals; MAFF Drainage Engineer in respect of applications for grant-aid for drainage works; MAFF Agricultural Officers for applications relating to surface works (ploughing); and Gwynedd River Board for drainage ditches through the Borth Internal Drainage District. Thus it was with some consternation that NC received a report of a River Board drag-line opening up a number of drainage ditches within the PNNR. Liaison procedures had apparently failed. The Board's Chief Drainage Engineer was operating unilaterally, with the stated intention of converting the whole of the PNNR, including the central core, to agricultural use. With no statutory requirement to take nature conservation into account, the Board was unmoved by negotiations. When a direct approach was made to MAFF London Headquarters seeking arbitration, the response was that the necessary statutory authority vis-à-vis River Boards was lacking. The Conservancy was thus left with little option but to make a direct approach to the Lord President of the Privy Council. As a result, in March 1964, MAFF was instructed to organise a conference locally to find a way forward. After two days discussion in Aberystwyth the conference recommended that the very wet central core should become a NNR, while peripheral areas were forfeited to agricultural development. With hindsight it is clear that this marked a turning point in reconciling local differences, with both the agricultural fraternity and the River Board agreeing to abide by the recommendations.

Ownership

By June 1964 the West Wales Field Society (WWFS) had successfully concluded a lease for Llwynglas farm peatlands near the southern boundary, the first Cors Fochno property to be given any form of legal protection. About the same time, with the appointment of additional land agents, NC were at last in a position to join the WWFS in negotiating with owners. In due course several allotments fringing the central core were acquired, but two owners wholeheartedly committed to drainage and agricultural reclamation preferred to wait until the potential agricultural value of their holdings had been realised.

The extraordinary complexity of land ownership, which can be traced back to enactments authorising the 'Inclosure of the Gors Fochno wastelands' in 1813, is a whole story in itself. Fortunately a key to unravelling the ownership situation was discovered in 1970 in the National Library of Wales, Aberystwyth, in the form of a leather-bound Award, written on parchment[4,5]. Apart from the rights of turbary, the Award mapped and numbered a series of small allotments (Fig 1) which were either sold or presented

Fig 1: Cors Fochno PNNR numbered allotments

to named individuals. After extensive searches only seven owners could be found who were able to prove title to 26 of the original allotments, amounting to just over half of the PNNR. Seven unclaimed allotments remained, straddling the important central core in a north-east/south-westerly direction.

From early on the principal landowner always accepted the importance to NC of the central core and, when approached, the Estate never refused to negotiate, but at the same time it never seemed able to agree a District Valuation. Only after experiencing very disappointing yields from crops sown in reclaimed fields adjacent to the PNNR boundary did the Estate finally agree to sell to the Nature Conservancy Council (NCC – successor to NC) in 1979. Perhaps the true extent of the difficulties associated with agriculture in the Cors Fochno environment made the difference, coupled with a revised valuation reflecting a very steep rise in agricultural land prices at the time.

Further attempts at agricultural reclamation continued, most notably in 1978-81 when new drains were excavated within the SSSI on the southern side of the bog, raising concerns about the hydrology of the entire NNR. However, by this stage the Wildlife and Countryside Act 1981 provided legal powers for entering into agreements with landowners, resulting in the new ditches being blocked and the land affected incorporated within the NNR.

To deal with the issue of unknown owners, an application for a Compulsory Purchase Order (CPO) was made to the Secretary of State/Welsh Office (Fig 2). The National Farmers Union objected on behalf of several members claiming ownership, as did the

An old drainage ditch, mostly full of moss but with what is believed to be an otter trail through it.

Ivor Rees

Fig 2: Compulsory Purchase Order allotments

Gwynedd River Board and a resident of Buckinghamshire (in the mistaken belief he would be prevented from walking along the foreshore around the Ynyslas dunes when visiting the area in summer). Each objection was examined in detail, but none could be substantiated. The individuals claiming land ownership could prove neither title nor right of occupancy. The River Board conceded that the CPO related exclusively to land ownership, not drainage, activities which would continue to be dictated by the terms of the Aberystwyth agreement. After all objections were formally withdrawn, the Secretary of State confirmed the Order, thus enabling NC or its successors to take occupation of the seven 'ownerless' allotments. No objections had been received from any member of the general public opposing the establishment of a nature reserve in the area.

A National Nature Reserve is declared

Ever since Borth Bog was first designated as a SSSI in 1952/53, the Nature Conservancy, followed by the Nature Conservancy Council and latterly the Countryside Council for Wales (CCW), were all heavily committed to protecting Cors Fochno. Nevertheless it took many years and several declarations before full legal recognition of the importance of this extraordinary place could be assured as a National Nature Reserve. It took a further seven years to conclude negotiations with the two remaining landowners. Sealing these two large conveyances in the early 1980s marked a particularly significant achievement. The original objective had at last been realised, securing the hydrology of the central core. More recently purchases have been completed along the north-west, north-east and south-west margins, so that today only relatively small areas of the hydrologically significant bog unit lie outside the protected area. As active, peat-forming bog requires the surrounding land to be poorly drained, these recent purchases should give extra security to the Cors Fochno ecosystem.

Peter Walters Davies worked for the Nature Conservancy as Regional Officer for South Wales from 1957-1973. James Robertson was author/editor for NCC and CCW, and is currently on sabbatical from editing Natur Cymru.

Acknowledgement

Grateful thanks go to the long-time warden of the Dyfi NNR, Mike Bailey, for helpful comments on this text.

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Cors Fochno

Cyforgors gefnforol yng ngorllewin Cymru yw Cors Fochno, ac mae ganddi ffurfiannau mawn sydd hyd at 7m o ddyfnder. Er gwaethaf y torri mawn helaeth a'r ymgais i adennill tir trwy ei ddraenio, dyma'r ehangder mwyaf o gyforgors tir isel ym Mhrydain. Nid tasg hawdd yw gwarchod safleoedd naturiol gyda'r gyfraith, a bu'n rhaid cynnal trafodaethau manwl am 30 mlynedd i sicrhau dyfodol y gors fel Gwarchodfa Natur Genedlaethol. Un peth a arweiniodd at yr anhawster oedd y ffaith fod cymaint o berchnogion tir i'w cael. Ar un adeg, tyfu tatws oedd dyfodol y safle, ond mae agweddau newydd wedi cydnabod ei bwysigrwydd i fywyd gwyllt.

Green **Bookshelf**

Seashores: An Ecological Guide
Julian Cremona
The Crowood Press 2014
Paperback
£16.99

What a joy to be given such a wonderful book to review! I thoroughly enjoyed exploring the many different aspects of the seashore and learning about the organisms that have evolved to live in these often challenging places, whether lichen-dominated splash zones, kelp on our rocky shores, sifting through the sand and mud of sedimentary shores or out onto the salt-marshes and sand dunes.

The book is so much more than a simple identification guide, covering the ecology of the shore. It is split into eight chapters, starting with Elements of the Coast – an introduction to ecological processes and the things that drive life on the shore, such as tides and abiotic and biotic factors. Subsequent chapters cover: Rocky Shores, Plankton, Sediment Shores, Salt-marsh, Sand Dunes and Shingle. Each shore type is divided into two parts: the first identifies the commonly encountered species that make up the different communities, and the second looks at the ecology of the whole. The final chapter covers threats and conservation.

I love the wonderful photographs which form the backbone of the book, coupled with the informative text which is full of interesting facts. I particularly like the annotated photographs that show where different species occur within habitats such as rock pools or on sheltered rocky shores. Even though I have a marine background, the book was full of new snippets of information.

My only minor criticism is that some of the photographs could be better referenced. Most of the time the relevant text and photograph are on the same or nearby page, but sometimes this does not happen, which might be a bit confusing for those not familiar with the species or habitat being discussed. This could be easily rectified in a future edition, and does not detract from the overall success of the book.

Kathryn Birch

The Ash Tree
Oliver Rackham
Little Toller Books 2014
Hardcover £15, 178 pages

This is a splendid little book. Oliver Rackham, who died in February 2015, is known for his authoritative but often voluminous works on woodland and forest history, and it is a treat to have his focus on a tighter subject – the ash tree.

Much of the book is a straightforward portrait of the ash, covering its evolution, ecology, use and cultural significance. As a tree it is not necessarily the most common, biologically rich, or important a source of timber, but nonetheless it is ubiquitous in our landscape, a stalwart of woodland management, and important as a species of 'wildlife'. Its cultural importance may be eclipsed by oak, beech or pine, but there are shadows of a deeper, prehistoric religious significance that are still cast around us.

Rackham is enviably astute in his observations of natural history, which often take on a new dimension through his historian's eyes. For example, he suggests that the mossy 'socks' commonly seen growing up around the bases of young ash trees may be a recent phenomenon resulting from reduced acid rain; in my twenty-odd years as a woodland ecologist I've grown familiar with these 'socks', but without Rackham's wider perspective I'd not seen them as any more than the normal state of affairs.

Rackham was inspired to write this book because of the serious ash tree disease Chalara, established in Britain in recent years, and described here in a wide context of plant pathology, human, and ecological history. Whilst too early to be sure what the eventual impacts will be, Rackham explains that the real problems lie elsewhere, in our inability to look ahead to deal with diseases before they strike (beware the potentially devastating Emerald Ash Borer), and in the bureaucracy, economics and political structures that encourage global plant movement and inappropriate tree planting.

In short, Rackham defines much of what is wrong with the way we view and manage our environment. I recommend it both as an entertaining and informative account of one of our best loved trees, and as a lucid and free-thinking perspective of where we continue to go wrong in our dealings with the natural world.

Jim Latham

The 3D slide collection at Amgueddfa Cymru/National Museum Wales

We are always looking for new ways to engage people with the scientific work we do in the National Museum/Amgueddfa Cymru. With one of the largest collections of mosses and liverworts in the UK (c.350,000 dried specimens), this is naturally an area we want to make more accessible. Mosses can be more of a challenge for educators than other, more familiar organisms, but it can be very rewarding to give what is, for many people, their first close-up view of mosses.

We are lucky that, in addition to specimens, Amgueddfa Cymru holds the 3D slide collection of Patricia (Pat) and Harold Whitehouse. These unique slides include images of birds, plants and fungi taken by Pat, a pioneering stereoscopic photographer; but the majority are non-flowering mosses and liverworts taken by her husband Harold. After Pat died in 1988, Harold aimed to systematically capture as many of the UK's 1000+ moss and liverwort species as he could, using a camera she had built specifically for this venture.

The 3,600 3D slides were made by hand; left and right images were mounted together so that the resulting 3D image could be seen using a hand-held viewer or via a projector and 3D glasses. Many images are of plants now preserved in Amgueddfa Cymru's collections, making a unique resource for natural history, photography and education. We are in the process of cataloguing each one.

Where possible, Harold photographed the plants in their natural habitat. Mosses growing in narrow crevices or water were a challenge, and would sometimes need to be removed from where they were growing. Nationally rare UK species, such as the Many-leaved pocket-moss *Fissidens polyphyllus*, could be difficult to find. Sometimes Harold photographed them in countries where they are more common, or from preserved specimens in his own collection.

AC/NMW

Adding conservation-grade accession labels to the slides

In *The Bryological Times*, 1990, Harold wrote that 3D photography allows better isolation of the subject from the background, which helps to highlight features of the plants. For example, on the slide of Narrow-leaved fringe-moss, *Racomitrium aquaticum*, you can clearly see the ring of peristome teeth around the dehisced capsules. Further slides show the toothed leaves of Common smoothcap *Atrichum undulatum*; the silver-white shoots of the common pioneer species Silver-moss *Bryum argenteum*; and the distinctive shiny, concave leaves of the northern Hare-tail moss *Myurium hochstetteri*.

As well as scientifically recording wildlife, Harold and Pat wanted to share their interest and inspire people. Pat's popular 3D shows played to audiences well before 3D films became a regular feature in cinemas. They were an eclectic mix, including travel sequences, bumble-bees on viper's-bugloss, and birds set to the Hallelujah Chorus.

At the Museum we have used the slides to create eye-catching displays. Our popular family-friendly interactive exhibition *Mi wela i...Natur/I-Spy Nature*, shows how scientists' observations led to new discoveries and how modern technology allows them to record nature in different ways. The 3D images are displayed on a large flat screen and visitors use 3D glasses to view them in colour.

External artist Andrea Büttner chose to include the slides in her *Hidden Marriage* exhibition in contemporary art galleries. They sat alongside drawings by Welsh artist Gwen John, moss specimens from Amgueddfa Cymru's collection, and a living moss garden.

Recently the 3D images have been included in the Natural Images project, which has digitised thousands of images across the museum's photographic collections, covering geology, botany, social and industrial history, and art. Almost 550 have been scanned at a high resolution: this will make them available for a range of purposes, and will be included on our website.

***Kath Slade**, Botany Curator, Amgueddfa Cymru–National Museum Wales*

Nature at large

This winter brought a rare and unusual discovery to the North Wales coast. A Pygmy sperm whale *Kogia breviceps* was found alive, stranded at Newborough, Anglesey, before a team of volunteers managed to return it to the water.

This unusual species is normally found resident in deeper water off the continental shelf edge and is only the second Pygmy sperm whale ever recorded stranded in Wales (the last one was in 1997), and the 11th in the UK as a whole since records began. Rarely seen alive, most of what we know about the species has come from examination of stranded animals. Like its giant cousin the Sperm whale, the Pygmy sperm whale has a 'spermaceti organ' in its head filled with oil which was once highly prized by whalers. The organ is thought to help control the whale's buoyancy, but the oil was harvested for use in candles, cosmetics, ointments and textiles.

Charlie Lindenbaum/NRW

Measuring the Pygmy sperm whale

Sadly, the same whale was found dead a week later at Dinas Dinlle, Gwynedd and a team from the Cetacean Strandings Investigation Programme (CSIP), led by scientists from the Zoological Society of London, travelled to North Wales to perform a post-mortem examination on the 2 metre long whale.

The examination revealed the animal was a juvenile male. The cause of death was not immediately obvious, and a full report will be made once the samples have been analysed.

Examination of the stomach contents revealed lots of squid beaks – the hard parts left behind from digested squid – as well as a large piece of plastic, which looked like the remains of a plastic bag. It wasn't thought that the plastic had caused the death of the animal, but it was a sobering reminder of the damage our litter can do.

Post-mortem examination of stranded marine mammals can provide a unique insight into causes of death, diseases, environmental contaminant levels, reproductive patterns, diet and other aspects of the general health of marine mammal populations in the seas around our coasts. This in turn provides important baseline data to help detect any future outbreaks of disease, unusual mortality events, or responses to environmental change (e.g. climate change). In the case of this stranding, the examination was also an opportunity to learn more about the biology of a rarely seen species of which we know relatively little.

As the examination was carried out on the beach, it was also an opportunity for members of the public to see this unusual animal at close quarters, and to learn more about it. I enjoyed talking about the whale to lots of local people, many of whom were surprisingly unperturbed by the gory scene unfolding on their foreshore!

It is important to report any whale or dolphin found stranded, dead or alive, as soon as possible, giving the location, size, species (if known) and condition of the animal. Marine mammals may carry disease, so never touch a carcass.

If you find a live stranded whale or dolphin, contact the RSPCA on 0300 1234999 or British Divers Marine Life Rescue on 01825 765546. For dead animals, contact CSIP on 0800 652 0333. For more information visit www.strandings.com

***Ceri Morris** is the Marine Mammal Specialist for Natural Resources Wales. Her role is to advise and gather evidence on marine mammal conservation across Wales.*

I name this field... Cae Tegeirianau

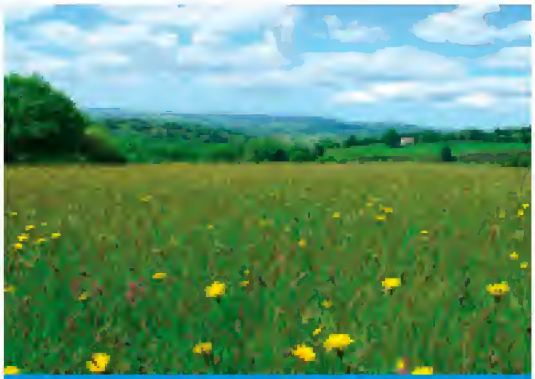
It takes a lot of imagination and commitment to run a farm on a National Nature Reserve (NNR). There's a fair chance that your land is not economically profitable – low nutrient levels are usually needed by many of your most valued plants or fungi. You may lack the economies of scale, and there's probably not many of you to do both the farming and the conservation work. Then there's the time needed to entice visitors onto your land, then to make sure they are safe, well orientated and well informed.

Here at the National Botanic Garden of Wales we have to deal with these challenges on our Waun Las NNR. With only one dedicated staff member to farm our 160 hectares reserve we need to find ways to break even, to conserve and enhance our biodiversity and to enthuse and inform a growing number of curious Garden visitors about the benefits of farming for biodiversity. We've just put in place an exciting Five Year Plan to help us to achieve this.

Like any healthy ecosystem, Waun Las's well-being needs several interdependent strategies to work well with each other. Our new plan will bring together the Garden's conservation skills, our existing organic farming methods, Coleg Sir Gar farming expertise in a management collaboration, and the Welsh Government Glastir Advanced environmental stewardship scheme.

Let's start with the farming itself. We're an organic working farm. Our herd of Welsh Black cattle and flocks of Welsh sheep breeds graze pastures that need careful

NBG



Cae Tegeirianau

manipulation to encourage the spread and quality of plants and fungi. Some areas need heavy grazing by sheep, others need light grazing by cattle. Enhancing hay meadows means cutting has to be carefully timed after flowers have set seed and visitors have had the opportunity to see, smell, photograph, draw or even forage in them. Hedgerows are managed to attract rare butterflies, and parkland trees managed for human safety and their biodiversity. Add to this the need to keep paths safe and open, keep waymarker posts and interpretation signs visible (as well as upright after cattle scratching) and, well, you can see there's a lot to do.

On our farm Huw Jones needs all the help he can get. Much of this will be coming via a new innovative partnership with Coleg Sir Gar, whose Gelli Aur Farm and Resource Centre is just three miles away. The college has a great reputation in the Welsh farming community. Their Farm Manager John Owen will be supporting the farm too, and helping to explore how agricultural production can be increased without compromising our commitment to farming for biodiversity. This will involve things like increasing the stock levels, improving our grazing regimes, and creating our own compost on fields which have suffered undergrazing in the past few years. In turn, college students will get to see alternative farming methods, and gain an appreciation of some of the wild plants and fungi that we are conserving.

Our 'farming for wildlife' approach will be enhanced by our new 5-year Glastir agreement. This is not an easy process. There's a lot of paperwork to do, and some very precise prescriptive environmental stewardship targets to be met on each of our 40+ fields and copses. But, in addition to money from organic beef and lamb sales, Single Farm Payments and Soil Association status, we now have an additional annual subsidy that contributes to ensuring that the farming operation breaks even.

Monitoring our wildlife is the final piece of our ecosystem jigsaw. As previously reported in *Natur Cymru*, we now have around a dozen volunteer wildlife recorders. Until now they have largely operated as a herd of grazing animals, wandering together and recording all they can see, but some members will now be responsible for recording individual

fields. Prompted by Glastir, we have ensured every field has its own name, largely based on oral history and archival searches. This really helps to create a more personal connection to the land – Cae Gwella, for instance, which has been used to bring sick livestock back to health, and Cae Brwyn, which sounds so much more interesting than Field 15. Some fields had no known name so we had to create them. This was a fun process which we based on location (Cae Gorswen – a field next to Gorswen Farm); on land feature (Cae Nant – a field with a stream running through it); or my favourites, on plants in the field. Cae Tegeirianau (Orchid Field) is one that, since we've been managing it as a hay meadow, has transformed into a species-rich meadow that now boasts four orchid species including hundreds of greater butterfly orchids *Platanthera chlorantha*.

Our next aim is to add wildflower records from Waun Las NNR onto the Garden's Database of Garden Plants, which currently stands at over 8,000 taxa. This new database has been designed to be used by visitors, and comes from a Norwegian company IrisBG. They've developed databases for botanic gardens and arboreta across the world, but we will be the first one which will include data on wild plants and other biodiversity on a nature reserve. We are also developing potential for visitors to be able to use their smartphones to find out, for instance, how Cae Tegeirianau is being farmed, what kinds of orchid grow there and what wildlife has been recorded. This, we hope, will really help us to demonstrate the benefits of farming for wildlife.

Bruce Langridge,
Head of Interpretation,
National Botanic Garden of Wales

Tribute to Ziggy Otto

When Ziggy Otto got in touch with Natur Cymru in its very early days, he was an unknown quantity. But he wrote an article about coastal change, and the dangers of putting the coast in a straightjacket, which far surpassed expectations. He became one of our most reliable and best contributors, and was always a delight to deal with. Here is a tribute to a great enthusiast and environmental champion.

I was saddened to hear of the premature passing of Ziggy (Siegbert) Otto on 4th January. Ziggy was someone who left a lasting impression on people. He was full of enthusiasm and curiosity, and he went into everything he did whole-heartedly. Until recently he worked for Natural Resources Wales as a senior marine conservation officer, where his PhD in coastal processes took him all over Wales. He enjoyed working with ecologists, environmental lawyers, developers and consultants, and he developed new-found interests to a high level, as witnessed by him pursuing his 2nd PhD, this time in fisheries law. He spoke German, English, Hebrew and Swahili, and had an earlier career as an archaeologist with some time spent in the Middle East.

Ziggy was born with short arms as a result of thalidomide, but I can hear him admonishing me for mentioning that; he never considered himself disabled, simply 'differently abled'. It certainly did not restrict him, he was well travelled, physically active, and a qualified PADI–Rescue diver. He also had a deep desire to share his many and varied interests: he lectured and published scientific papers, gave talks to local groups, and regularly wrote articles for local papers. He excelled at making science interesting and available to everyone, and his nurturing nature repeatedly gave young people a chance to learn. In the last 18 months he lived in Kenya and, while doing consultancy work and writing for the *Turkana Times*, he did his part to further the chances of local children and young people to receive an education.

Ziggy was a power of nature and concentrated a lot of life into his short 53 years. His character and free spirited attitude will be greatly missed by his old colleagues.

Charlotte Gjerlov

Islands round-up

The winter seabird wreck of early 2014 was considered to be the worst in living memory, with 30-40,000 dead or very weak birds being washed up along the coast of Western Europe. The peak time was in mid to late February. About half were puffins and a quarter guillemots, many being of breeding age. Information on how this might affect the seabirds of the Pembrokeshire islands was therefore keenly awaited.

Skomer

Work on the breeding seabirds, which began for six species in the 1970s, continued in 2014. The full results are in the excellent *Skomer Seabird Report 2014* which is available on the Wildlife Trust of South and West Wales website. Puffin counts were especially significant, as so many were killed in the winter wreck. Only 59.5% of 2013's breeding adults returned in 2014, a serious decline compared with 84.2% the previous year and the long-term average of 91.1%. The productivity was 0.53 chicks fledged per burrow, 25% lower than in 2013, and the last two years have been two of the latest breeding seasons on record. The picture will become even clearer once the 2015 results are available, but it certainly seems that the puffins were badly affected by the storms of 2013/4.

Guillemots and razorbills seem to have fared better than puffins, with guillemot numbers up by 12.6%. However, it may take several years for effects of the wreck to show up, as losses of adults are masked by young (non-breeding) birds moving onto the ledges to fill gaps left by the missing adults. Razorbill productivity was well down at only 55% of the average.

Skokholm

Buildings: when the island was bought by the Wildlife Trust in 2007, the buildings and observatory facilities were in complete disrepair. An enormous effort by volunteers over several years achieved the complete renewal of the accommodation, allowing the Bird Observatory to reopen. In recognition of this, the Friends of Skokholm and Skomer received the Marsh Award for Local Ornithology in 2014. In the Observatory's first full year 6,098 new birds of 59 species were ringed. Rarities seen included a collared pratincole (the first for Pembrokeshire), four red-breasted flycatchers and an ortolan bunting.

Bats: there were also important developments in bat recording in 2014. The Pembrokeshire Bat Group donated an automated SM2 bat detector which allowed bats to be monitored every night – much more productive than walking round with a hand-held detector! It was on site from April to early November. Further records came from an Anabat recorder deployed by BSG Ecology. These two devices produced a deluge of bat records. Up to 2013 there was only one noctule record but in 2014 they were recorded almost nightly from August onwards. Four new species were added to the island list – common pipistrelle, Nathusius' pipistrelle (a rare migratory species), Leisler's bat and greater horseshoe bat. BSG Ecology also installed Anabat recorders on Skomer and Ramsey: the full results can be seen on www.bsg-ecology.com.

Digitising past records: in 2014 a grant from Environmental Wales paid for the Skokholm bird logs from 1974 to 2002 (29 years) to be transferred from paper to a digital database, 14 volunteers being involved. The Friends of Skokholm and Skomer intend to go further back in 2015 to tackle the remaining bird logs, from 1933 to 1970. There were no logs in the war years 1941-1945 as the War Office moved Ronald Lockley to the mainland. Anyone interested in helping with this work on the island (free accommodation, some help with travel costs) should contact Phil Blatcher (blatchers@hotmail.com or 01992 441024).

Lyndsey Maiden

Puffin *Fratercula arctica* lleir y diffeithwch

Geoff Gibbs

Offshore early warning network

Last year, as part of my degree course at Aberystwyth University where I study Marine and Freshwater Biology, I began a one-year placement with the Marine Monitoring Team at Natural Resources Wales (NRW). This has given me incredible opportunities, and I have already gained valuable experience and skills in addition to enjoying every second of the working day.

One of many highlights has been the opportunity to spend ten days working offshore with CEFAS on their vessel *Endeavour*. Sailing from Swansea, our task was to service five Smart Buoys located in the Irish Sea, Atlantic and English Channel. The buoys act as multi-parameter platforms, used primarily for collecting data about the surrounding marine environment. These platforms record salinity, temperature, turbidity, oxygen saturations, chlorophyll fluorescence and nitrate concentration. By monitoring any changes we can help record the state of global climate change: rapid changes of these conditions can quickly make life hostile in the marine world.

Anthony Barker

Surfing the bow wave

Non-natives

Recently these buoys have had a secondary purpose, monitoring marine non-native species introductions into Wales and the rest of the UK. These introductions can sometimes have catastrophic effects, with local extinctions of some of our native species. The Marine Pathways Project (MPP) encompasses several UK environmental organisations, including CEFAS and NRW, and aims to protect biodiversity by monitoring and preventing the introduction of non-native species. Structures like buoys and offshore platforms can enable these species to cross the deep sea barrier by offering a hard substrate, creating a 'littoral like' stepping stone. The voyage was one of a series of regular CEFAS maintenance cruises where the MPP has tested the usefulness of Smart Buoys, and involves attaching fibreglass settlement plates to the buoys which are then retrieved after six weeks. I helped to remove and photograph these plates, which were covered in interesting flora and fauna. The samples were collected and sent off for analysis to see if the UK is at risk from any new invasive species.

Species

The Celtic Deep, an area between south Wales and Cornwall, is known for its high sea bird populations as the coastlines offer a wide range of nesting habitats. During the voyage to the Celtic Deep buoy hundreds of sea birds would surround the ship and follow us: some species would not return to land for months! The high shipping activity and consequent anthropogenic waste offer the birds a ready food supply.

Welsh seas are also known for large populations of common dolphins. Travelling between buoys offered time for me to survey and photograph these cetaceans. There were multiple sightings daily, and often different pods of common dolphins would join together – I estimated there were sometimes over 50 dolphins leaping up ahead, bow-riding the pressure wave produced from the ship. Other species like the harbour porpoise were also sighted. Unfortunately I'll have to wait for my next survey to fulfil my aspirations and spot a fin whale!

I learned so much whilst at sea, and I really enjoyed working offshore. Not seeing land for days on end was sometimes daunting, but the fresh sea air and the mountain of food at every meal gave me a strong incentive to start the day each morning; and the humorous banter between the crew kept me laughing throughout the day. By the time land came into sight and my time on *Endeavour* was over, setting foot on stable ground was somehow a disappointment – I really did love life on the sea and I can only hope I will be able to return to offshore survey work one day.

Anthony Barker

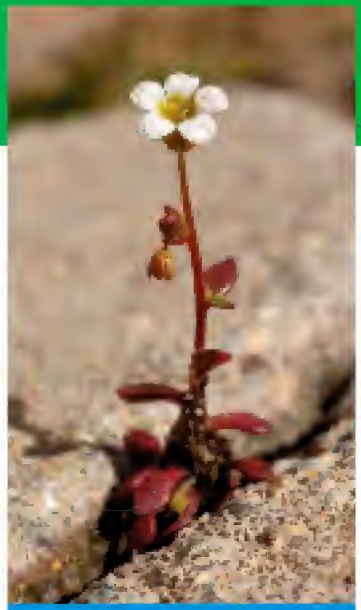
My front garden

Life on the street

It takes some adjustment to life in a town house with a door onto the street after years of tending gardens, including a front one. So it is gratifying to find that modern block-paved streets are a welcoming environment for several delightful species of plant.

No doubt council cutbacks also help, with the reduction or total stoppage of 'cleansing' weed killer applications.

Concrete blocks set in sand seem to be a good mimic for soil-deficient rock ledges high in the Beacons and Black Mountains, with a regular flush of Rue-leaved saxifrage *Saxifraga tridactylites* (Tormaen tribys) outside my front door every spring. This little gem of a plant may have many more sought-after brothers and sisters in our gardens, but is a delightful untameable annual that is well worth examining closely. Sometimes it can be found in the mortar of an old wall, and occasionally the plants can be quite large if conditions allow. But, as with many annuals, it gets by with the minimum of growth when it has to, and a magnifying glass or close-up lens is needed for a full appreciation.



John Crellin

Rue-leaved saxifrage *Saxifraga tridactylites* Tormaen tribys, growing in a pavement in Hay on Wye 2008. It stands only about 2.5 cm high

Sand spurrey *Spergularia rubra* (Troellig arfor coch) has found the man-made urban environment well to its liking and is also now found alongside some of our roads. The specimens on my pavement are proving very resilient to trampling by walkers, and survive right in the middle of the footway. I also have the feeling they can live longer than a year despite being written up as annuals. The Saxifrage, in contrast, keeps to the less-trodden areas and disappears smartly after the reproductive job is done – leaving plenty of fine seed for next year.

John Crellin

Malling toadflax *Chaenorhinum origanifolium* Trwyn-y-llo Caint

As you might expect, there are several grasses that make a living in this environment, also a Canadian Fleabane *Conyza Canadensis* (Amrhydlwyd Canada) that frankly looks untidy, and even I cannot excuse from weeding. Several liverworts make good of what appears to be an often dry environment and Common sorrel, *Rumex acetosa* (Suran y cwn) has turned up as well.

But all the neighbours agree, I think, that Malling toadflax *Chaenorhinum origanifolium* (Trwyn-y-llo Caint) is a welcome visitor – now established and spreading for several years, almost always in flower (even on New Year's day) and keeping neatly to the area by the house walls. I suspect a jump for freedom from a window box but cannot be sure. It certainly is now an established introduction worthy of recording. The genus is native to Turkey and the Mediterranean, and closely related to our native Common toadflax *Linaria vulgaris* (Llin y llyffant) that appears on so many Welsh roadsides in late summer. Malling toadflax has been colonising a wall in West Malling, Kent since 1880, hence its English common name.

John Crellin

Buglife

Stuart Croft

Ameletus inopinatus

Riverflies are at the heart of freshwater ecosystems in Wales and are a vital link in the aquatic food chain as a food source for fish such as brown trout, and birds such as dippers and grey wagtails. They include the mayflies Ephemeroptera, caddisflies Trichoptera and stoneflies Plecoptera. Living most of their lives as larvae in freshwater habitats before emerging as adults, they are good indicators of environmental condition as they are sensitive to changes in water quality.

The rivers of Wales are particularly important for riverflies. High up in Snowdonia, small stony mountain streams are home to many stonefly and mayfly species, such as the February red stonefly *Taeniopteryx nebulosa*, the Yellow-spotted sedge *Philopotamus montanus* and the Iron blue mayfly *Baetis muticus*. The Upland summer mayfly *Ameletus inopinatus* also thrives in the cold water but faces an uncertain future, as research shows that climate change could result in this species being lost from the Welsh fauna.

Further downstream the River Wye is home to the Yellow sally stonefly *Isoperla grammatica*, the Large brook mayfly *Ecdyonurus torrentis* and a caddisfly called the Welshman's button *Sericostoma personatum*. The Yellow mayfly *Potamanthus luteus* also occurs here. It is an attractive species that emerges in large numbers during the summer. It was once found in the Rivers Thames, Usk and Wye, but is now only found in the lower Wye, an area that is also home to rare caddisflies and stoneflies. The caddisfly *Setodes punctatus* is known from Symonds Yat and Ross-on-Wye; however there haven't been any recent records of this species so it is unclear whether it still occurs in Wales. The Scarce February red stonefly *Rhabdiopteryx acuminata* lives amongst cobbles and coarse gravels on the river bed and emerges as an adult in the Spring.

Further north, the Rare medium stonefly *Isogenus nubecula* has only ever been found in the River Dee, in the deep water of the lower river. Despite repeated surveys, this incredibly rare stonefly was last recorded from the Dee in 1995 and it now appears that it may be extinct in the UK.

Other freshwater habitats are also important for riverflies. In ponds you can find species such as the Pond olive mayfly *Cloeon dipterum*, the Early brown stonefly *Nemoura cinerea* and caddisflies such as the Cinnamon sedge *Limnephilus lunatus* and the Mottled sedge *Glyphotaelius pellucidus*.

Around small peatbog pools you might be able to find the Window-winged sedge *Hagenella clathrata*. This day-flying caddisfly is known from Fenn's, Whixall and Bettisfield Mosses National Nature Reserve, where it lives as a larva in small pools between tussocks of Tufted hairgrass *Deschampsia cespitosa* and Hare's tail cottongrass *Eriophorum vaginatum*.

Even springs and small woodland seepages are important for riverflies. The caddisflies *Plectrocnemia brevis* and *Adicella filicornis* are both found in small springs and streamlets in broad-leaved woodland. The small size of these habitats makes them incredibly fragile and prone to damage from other work in the woodland, such as felling operations or footpath construction.

The freshwater habitats of Wales are undeniably important for riverflies. If you would like to find out more, visit Buglife's freshwater pages at www.buglife.org.uk

Craig Macadam

Stuart Croft

Philopotamus montanus

Buglife *is the only organisation in Europe dedicated to the conservation of all invertebrates, aiming to halt their extinction and achieve sustainable populations.* ***www.buglife.org.uk***

Can Ancient Woodland benefit farmers without detrimental impacts on the farm balance sheet?

Ancient woodlands (those continually afforested since at least the 1600s) and farming are both part of our history, and yet woodland management is often seen as a completely separate entity and has not been fully integrated into modern farming practices. The Woodland Trust has been supporting landowners of ancient woodlands, and it has become apparent that the wildlife value of these woods is under threat from development, inappropriate management or damage inflicted by invasive species or diseases. The woods are relatively small and fragmented and many have suffered from conversion to conifers in the 20th century: an average farm holding in Wales is c.80 hectares, with woodland covering 10ha on average.

With this in mind, how can these woodlands be managed to benefit both farmers and biodiversity?

Current practice

Thinning planted ancient woodland can often seem a costly exercise due to issues of size, quality and accessibility. Clear-fell practices are sometimes adopted as the easier option, but this rapid removal of the canopy has significant impacts on the landscape, affecting habitats, aesthetic values, and the amount of water and nutrients formerly retained by the trees. In addition, livestock and wildlife which used the trees for shelter are now exposed to the elements. Farmers are often influenced to clear-fell by not fully understanding what valuable assets their woodlands are. They are also swayed by grants, or simply by lack of time to do 'woodland management'. It seems a better approach therefore to look at the products which are needed on a farm and to work backwards to see how these might be sourced.

Self reliance

Timber: Most farm buildings include timber in their construction which needs maintenance, including 'Yorkshire boarding' on slat-sided animal sheds. Furthermore, holiday lets of small timber units are becoming increasingly popular and could become an extra income source, made from materials grown on the farm.

Energy independence: Modern wood-fired heating and energy systems are increasingly more affordable and could be fuelled by home-grown wood.

Fencing: Thinning woodlands and buying in machinery or services to produce fencing materials seems an obvious step, but is not one always taken. Working more closely with neighbours who have similar woodlands can quickly reduce costs with economies of scale.

Animal feeds and bedding: Wholesale costs of straw have risen, with dealers now selling to biofuel power stations, and there is a carbon footprint involved in transporting straw across the country. The average cost of housing 75 cows on straw over 16 weeks is around £4000. However, if woodchip is used as a base layer to the straw it aids drainage and keeps straw dryer for longer, and can be re-used up to 4 times before being composted. This could be bring costs to as low as £1400 for 16 weeks, a significant saving.

Alternative feeding systems work in many organic farming systems. Willow and poplar silage contain salicylic acid, condensed tannins and other trace minerals (which may help to reduce inflammation and act as an antifungal agent reducing ringworm) and selenium and copper which may help in the fight against brown stomach worm, *Ostertagia ostertagi*[1].

Adopting a gradual approach to managing ancient woodland offers a long term supply of on-the-doorstep farm materials as well as benefiting conservation. Diversifications such as holiday lets, or reducing costs in fuel, fencing materials or animal bedding, are a more sustainable income source and deliver more long term biodiversity gains as well as animal welfare benefits.

Christopher Matts
Coed Cadw/Woodland Trust
www.woodlandtrust.org.uk/restoration

1. Min, D., Pomroy, W., Hart, S. and Sahlu, T. 2004. *The effect of short-term consumption of a forage containing condensed tannins on gastro-intestinal nematode parasite infections in grazing wether goats.* Small Ruminant Research, 51(3), 279-283.

Awr Ddaear y WWF

Dechreuodd Awr Ddaear y WWF yn Sydney yn 2007, ac mae wedi mynd o nerth i nerth. Y llynedd, cymerodd 162 o wledydd ran yn yr ymgyrch, ac aeth miliynau o bobl ati i ddiffodd eu goleuadau er mwyn dangos yn gwbl glir fod y blaned yn bwysig iddynt.

Yng Nghymru, diffoddodd tirnodau fel Castell Caernarfon, Llyfrgell Genedlaethol Cymru a Phont Gludo Casnewydd, yn ogystal ag oddeutu hanner miliwn o bobl, eu goleuadau.

Mae neges y WWF yn syml: Un blaned yn unig sydd gennym, ac mae hi eich angen chi. Ymunwch, gan ddiffodd eich goleuadau i ddangos eich bod yn malio.

Bydd Awr Ddaear y WWF yn cael ei chynnal eleni:

NOS SADWRN 28 MAWRTH
am
8.30PM AMSER LLEOL

Gallwch gofrestru ar-lein ar earthhour.wwf.org.uk

WWF Earth Hour

Earth Hour began in Sydney in 2007 and has gone from strength to strength. Last year 162 countries participated and millions of people, turned off their lights and sent a clear message that they care about the planet.

In Wales landmarks such as Caernarfon Castle, The National Library of Wales and Newport Transporter Bridge, as well as around half a million people, all switched off their lights.

The WWF message is simple: We only have one planet, and it needs you. Join in and switch off your lights to show that you care.

This year's Earth Hour is:

SATURDAY 28 MARCH
at
8.30PM LOCAL TIME

You can sign up online at earthhour.wwf.org.uk

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INTENSIVE WEEKEND COURSES

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Our Countryside: Change & Community	24-04-15
Landscapes and Conservation	05-05-15
Invertebrate Macro Photography	15-05-15
Welsh Wildlife Centre, Cilgerran	
Gardening for Wildlife	01-05-15
Forest Gardening	09-05-15
Denmark Farm, Lampeter	
Bird Identification	17-04-15
Forest Gardening	25-04-15
Wildlife Digital Photography	01-05-15
Diversity of Invertebrates	15-05-15
Field Survey Techniques	20-05-15
Understanding British Mammals	12-06-15
Centre for Alternative Technology, Machynlleth	
Permaculture Design Course 3	18-04-15
Bird Identification	01-05-15
Botany for Gardening	09-05-15
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